School Shop

vol. XII no. 4

DECEMBER, 1952

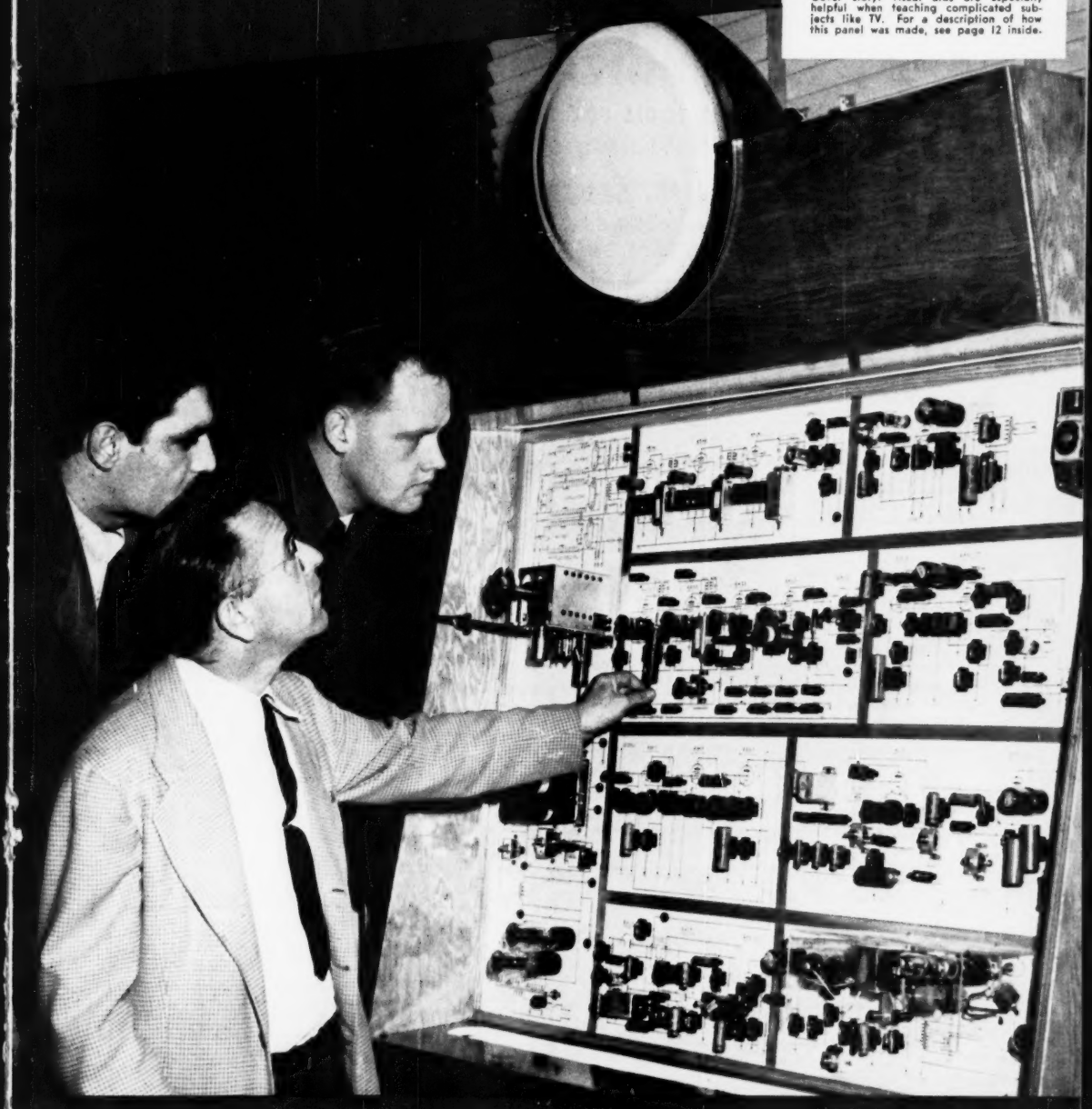
Training for Tomorrow
by Loren H. Carter

Plastic Pencil and Letter Holder
by Cecil Acuff

Demonstrator Simplifies TV Training
by Norval F. Fell

Teaching Automechanics Without a Car
by Harold T. Glenn

Cover story: Visual aids are especially helpful when teaching complicated subjects like TV. For a description of how this panel was made, see page 12 inside.



THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

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Special Honorable Mentions: John C. Edelmann, Baltimore, Md.; Ned Peyton, New York, N. Y.; Joseph Evancho, Indianapolis, Ind.; Conrad Gable, Brooklyn, N. Y.

Winners were selected by a panel of judges composed of five outstanding educators, nationally distinguished in the field of Industrial Arts and Vocational Education—

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Winners announced and prizes awarded concurrently with the A. V. A. Convention, Boston, November-December 1952.

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School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

Vol. XII, No. 4 DECEMBER, 1952

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COMPARE YOUR TEXTS WITH THESE FAVORITES

The new semester will start in a matter of weeks. Are you completely satisfied with the texts you are now using? Do they latch on to the student's interest and hold it throughout the course, making your job easier? If not, examine these school shop favorites. Here they are, each a classic in its field. Plan your selections now—give yourself the benefit of a text that is teacher-tested across the nation—a text that helps, not hinders, in putting across the subject matter of your course.

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Graduate Credit for Shopwork?

The question of what subjects to elect in graduate programs is one which comes up periodically when teachers are in the process of acquiring their Masters degree. In common with others, industrial-arts teachers expose themselves to certain required courses and elect others from a list drawn from two or more different areas. Except in the cases of a few colleges, all of these courses, either required or elective, are in subjects only remotely related to industrial arts, or in industrial-arts courses of a theoretical nature.

Apparently it has not occurred to the faculties of many of our graduate schools that work of a graduate character may be done in the manipulative areas of industrial arts. So we find teachers in our fields working away at psychology, philosophy, or the history of education, and engaging in a little abstract research, when, as teachers of shopwork, they need some training in their subject-matter field in addition to the experiences they had as undergraduates.

In a number of our large universities, it is possible for teachers in the fields of English, mathematics, physics, and chemistry to do much of their graduate work in the areas of their interests as teachers. Strangely enough, in the same institutions it would be considered heresy to even think of anyone receiving graduate credit for work in an industrial-arts shop.

There may be a number of explanations of this attitude, but one of the most obvious is that the members of the graduate faculties of these universities have a narrow point of view concerning any subject but their own, and are totally ignorant of the educational value of industrial arts. Moreover, since they outnumber the representatives of the industrial-arts program, and since they are bound up in tradition, they frown on any suggestion that certain types of shop work be approved for graduate credit.

Problems appear in the teaching of industrial arts just as they do in other areas of teaching. Moreover, these problems are just as profound as those encountered in mathematics or physics. And many of these problems lend themselves readily to research which would compare favorably with much that is done in other fields. Then too, since the teachers in other areas are encouraged to do much of their graduate work in their teaching fields, it is difficult to understand why the same privilege is not extended to those in industrial arts.

As a rule, graduate programs are controlled by faculties drawn from academic fields. These faculties have acquired a vested right in graduate work and, because of their restricted point of view, resent the inclusion of anything of a so-called practical nature. This is unfortunate but it presents a hurdle which the professors of industrial arts must overcome.

We are uncertain as to how this can be done, but one thing is certain. In their efforts to break down the bias that exists, teacher trainers must assure themselves that whatever they present for the approval of the controlling group is in fact of graduate caliber.

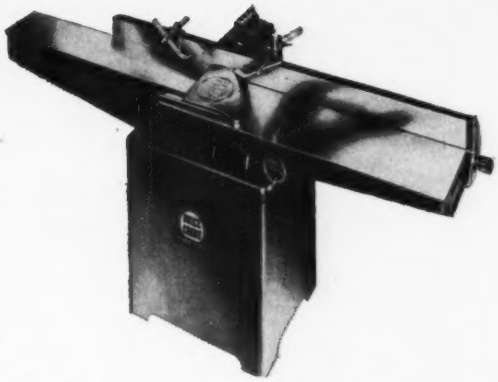
Significant research problems to be solved might be presented first. From this it is merely a step to the suggestion that advanced work in the manipulative processes be accepted. When the representative of industial arts feels sure that his proposal is sound from a graduate point of view, he must present his case with assurance. Pussyfooting only leads to failure. He must be persistent and maintain his pressure, even in the face of discouragement. If he has a legitimate case and he persistently annoys the privileged group, it is almost certain that progress will be made.

Let us, therefore, agree on what we honestly believe constitutes a graduate program in our field, and let us push—and keep on pushing. If this is done, success can be achieved.—*T.D.*

Hats Off!

A recent visit to Washington has convinced us that vocational education's interests there are in good hands. We spent some time with both Assistant Commissioner for Vocational Education Strobel of the USOE and Secretary Mobley of the AVA. Both are doing outstanding jobs in difficult situations. We wish them well!—*L.W.P.*

HOW LONG *should* JOINTER TABLES *and* FENCES BE?



In jointer design there is a definite relationship between fence length and table length. It is generally conceded that a jointer is as good as it is long. Lengthening of a table alone is not sufficient to increase the scope of use of a jointer. The fence, likewise, must be extended and should always be as long as the infeed table plus 60% of the length of the outfeed table and ABSOLUTELY RIGID ALONG ITS ENTIRE LENGTH. To assure accuracy and avoid work spoilage, tables and fences furthermore must be absolutely flat and straight, AND STAY THAT WAY.

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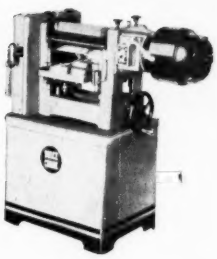

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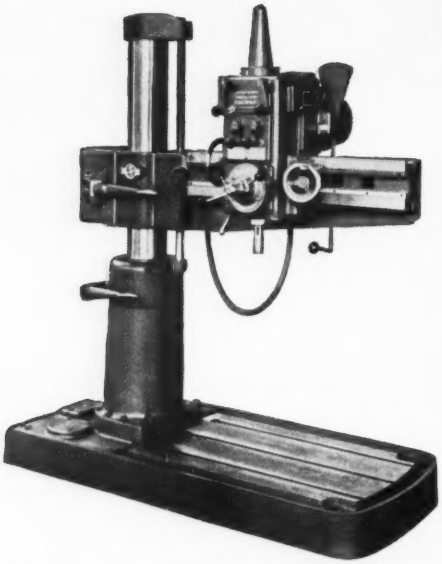

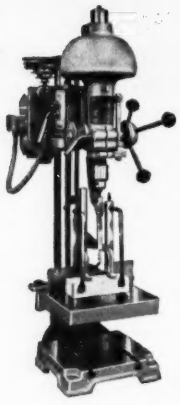

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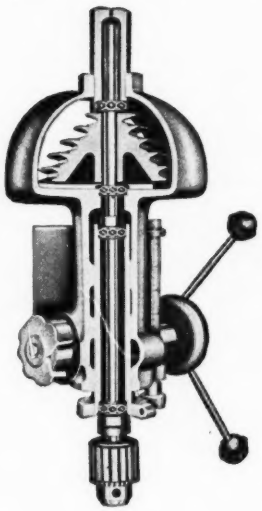

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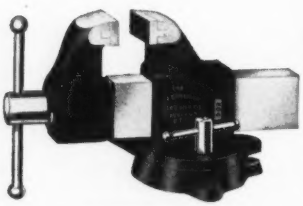

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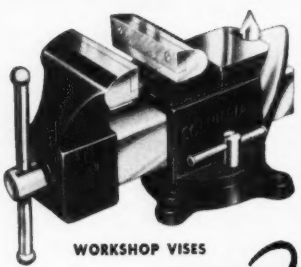

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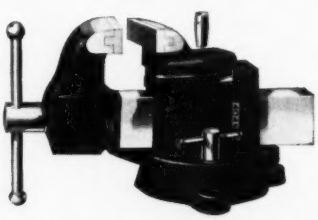

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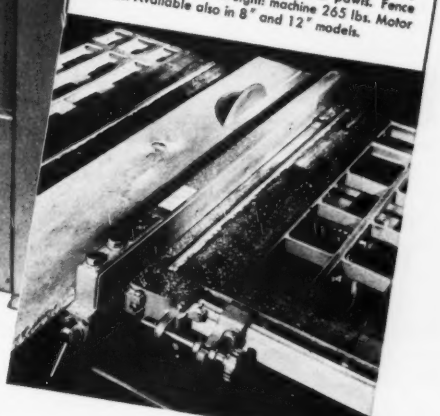

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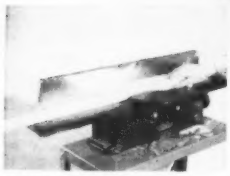
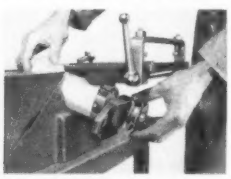
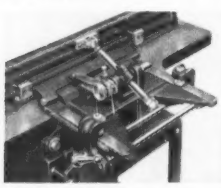
Atlas 6" JOINTER-PLANER



SAFER! The extra-long Atlas table and fence provide solid, safe support. Blades are covered front and rear of fence!



MORE EFFICIENT! Removable cutterhead saves many hours each semester in blade sharpening.



NEW FENCE MOUNT! A 3-point rigid mounting, positive 45° stops, exclusive width-of-rabbet scale.

MORE VERSATILE! Fence removes to provide over 12" wide support for planing wide boards.

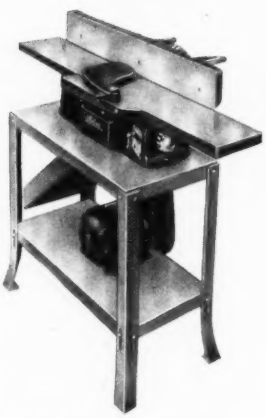
Helps Make Students' Shop Time More Productive Than Ever

A 5-minute comparison and most vocational educators agree: *this is the finest 6" jointer-planer ever developed for the school shop!*

Your yardstick will show you the safe, work-support size of the tables and fence. Note that the Atlas fence is longer than the tables of some jointers! And both tables and fence are close-tolerance ground to a mirror-smooth finish—*with table surfaces aligning to within .005" over-all!* That's accuracy that helps you teach the value and thrill of precise workmanship.

The rear table is stationary—saves time, improves work accuracy. Note how it widens for planing large boards with fence removed. Note the rigid fence mounting, adjustable stops, and exclusive width-of-rabbet scale. And another important feature—the cutterhead is removable for sharpening blades without disturbing their setting! Cutter-head-spindle is one piece solid steel—spins on sealed-for-life ball bearings.

The Atlas 6" jointer-planer is a sound tool investment for your school. Ask your Atlas dealer to show you all its many features.



STAND, and DUST CHUTE

Heavy-gauge steel stand for the Atlas 6" jointer-planer is ready drilled for bolting the jointer in place. The bottom shelf adjusts up and down for proper belt tensioning. Dust chute, furnished, keeps chips and shavings safely away from motor. Stand with chute measures 13" wide, 27" long, and 27" high.

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If students don't end up in the trade for which they trained, then what?

Training for Tomorrow

By Loren H. Carter

Manager, Training Department, The Lakeside Press, Chicago, Illinois

MAKE no mistake. The topic is not "Education for Tomorrow." I feel quite inadequate to discuss the social and moral objectives of education.

But on one objective of education I do have opinions—backed by constant association with the problem over far more years than I care to admit. That is the vocational objective. The title, "Training for Tomorrow," indicates my intent to limit consideration to this vocational objective.

To meet the vocational objective of public education, we must train boys and girls to acquit themselves well in the physical world in which they are to live, whatever the trends of commerce and industry. Stated more precisely: training that will aid individuals to make their maximum contribution, creatively, constructively, and productively, thereby adding to the material wealth of their country, while providing for themselves an ever higher standard of living.

Let us experiment with this problem.

Experiment 1.—Is there a linotype instructor who can say, "My students will all be lino operators during their vocational life. Therefore, by concentrating my full effort to perfecting their skills on a linotype, I will accomplish our vocational objective."

Is there a press instructor, a composing-room instructor, or an instructor of any specific trade activity who dares make such a statement? If so, my answer is, "Brother, wake up!" I could not make such a statement with confidence and we are training young people in our plant through trade apprenticeship.

The records show that percentage-wise you would be a mile from the facts.

Here are personnel records of 23 apprentice graduates (random selection), their vocational selection at high-school level, and their final trade selection:

2 journalism—both proofreaders.
3 art work—two offset artists, one photo retoucher.
2 auto mechanics—pressman (linotype operator), pressman.
4 machine shop—two pressmen, two machine binders.
1 teacher—pressman.
1 power plant—pressman (offset artist).
1 musician—pressman.
4 printing (general)—two pressmen, one compositor, one photoengraver.
1 printing (presswork)—offset artist.
1 printing (bindery)—hand binder (photoengraver).
3 commercial photography—two machine binders, one commercial artist.

These young people had the following shop training: 9, print shop; 4, technical high school shop; 4, auto shop; 2, wood shop; and 4, no shops.

We can readily see that if these samplings are typical, shop selection, or student selections of vocation, at best predict only the general fields of interest, such as mechanical, manual, scientific, literary, or artistic (19 of 23); and the type of job satisfactions the student is looking for. To further complicate vocational predictions we have the force of chance and circumstances.

How then are we going to train for "the physical world in which they are going to live," when the school-shop activity is only occasionally the one selected subsequently as a vocation?

Experiment 2.—Here are two boys who chose printing as their vocation while in high school. Let us examine their records more carefully and compare their school-shop objectives to their present job objectives.

Student A had hand composition and presswork in high school. He preferred presswork, so concentrated to the extent of becoming proficient as a hand-fed platen pressman, and had some experience on a small automatic. His present job is on a giant five-color, perfecting press that feeds a web and delivers signatures.

Where did he gain the greatest degree of preparation for this job? Was it in the school print shop where he learned to operate a platen press? In the physics class where he developed an understanding of fundamental concepts governing mechanical phenomenons such as gears, forces, cams, pressures, temperatures, mechanical advantage? Perhaps the auto shop where he learned practical mechanics and trouble-shooting techniques?

Student B had hand composition as shop activity plus the hobby of being high-school photographer. He is now in photoengraving where he was trained as plate-photographer, then given supplementary training as operator of an electronic scanner, which position he now holds.

Where did he get his greatest pre-vocational help? In the high-school composing room? Through his hobby of photography? In the physics class where he learned of light, color, optics, and electricity? In the chemistry class where he learned of chemical relationships? Or in an art class where he learned to appreciate aesthic values?

How are we going to train for "the physical world in which they are going to live" when we are unable to more than simulate job environment and equipment? And we may be training the boy for a job that does not yet exist today, or will be performed with entirely new methods and equipment.

Do not get me wrong, I'm not poking fun at anyone. There is much to be said for every instructional program. And, still further, I have complete confidence that these two problems, just highlighted, can be solved by shop teachers.

I am only battling for the idea that this is a team job, a job requiring the coordination of all devices for training the mind and hand—hopeful that they will function properly whatever the choice of vocation, or the effect of industrial progress.

There is no evading it, this student of yours is going to develop and practice his skill in *his* world, not in grandfather's world, or even in our world.

Moreover, industry must not be held static by routinized, one-job workmen. And, as a corollary, individuals who would be secure in employment must not be content with narrow, routine capabilities.

Challenge No. 1

The key answer to this problem is versatility. But here is another chance for shallow thinking. Versatility, as we use the word, does not necessarily imply two, three, or four skills. We are not thinking of a jack-of-all-trades. Versatility is rather an inner capacity to adjust, to shift—not unlike the championship boxer who is able to side-step, feint, or rock with the block, and thus maintain vertical equilibrium.

Our first challenge is: "Versatility is and should be a product of training."

Challenge No. 2

We may readily accept the statement recently made that less change took place in the centuries between the years of Moses and those of our great-grandfathers than has been made in the decades since great-grandfather. Obviously the "rate of change" is an accelerating curve, growing faster day by day.

Here is an illustration:

John Weber was born in 1790. At birth he had a life expectancy of 37 years. At the age of 15 he was vocationally equipped with skill, knowledge, and tools to be a carpenter. This vocational equipment qualified him for 80 to 90 percent of the 22-year work period. Technological change required only limited relearning and retooling.

Joe Foster was born in 1950. He has a life expectancy of about 67 years. At about 20 years he will be vocationally equipped. But Joe's vocational equipment will cover but 10 to 15 percent of his 47-year work period. He must repeatedly learn, discard, and relearn; tool, discard, and retool.

Which age are you training for?

John was trained in the age of the craft guilds when father passed his art and skill to his son. Joe, on the other hand, will seldom use identical equipment or follow the same methods and techniques five successive years.

Except when it is basic and fundamental and answers the question "why," instruction is often obsolete in a few years—and should not be passed on. True, we must know what, when, who, and how. These we must know to do today's job, but if workmen contribute to progress or accept the developments of research and engineering, it will be because they are wisely versed in the "reasons why." A good workman understands his job.

This is our second challenge: "Understanding and basic knowledge is, and should be, a product of training."

Challenge No. 3

The printing business is now a complicated, technical, mechanical business. Significant decisions invariably involve understanding of materials, techniques, scientific or mechanical knowledge, and human relationships. Ideally, therefore, supervisors and executives may well be skilled workmen equipped with knowledge and understanding in all these fields. But men in the ranks are not promoted arbitrarily or by accident. Promotion comes when trade knowledge and skill is supplemented by attitudes of leadership, cooperation, teamwork, and human understanding. Training should aid in qualifying workmen for promotion.

Our third challenge is: "Basic preparation for promotion is, and should be, a product of training."

These three challenges (versatility, basic knowledge, and "promotability") are essential products of good training, yet often stand neglected by many so-called trainers. Too often the target has been narrow, specialized performance, attaching primary importance to single abilities.

Some Answers

I would be a piker if I quit at this point, without suggesting some methods of meeting these challenges. Here is a list of six:

1. Teach the boy to work.—Does the boy know that most industrial work is sold by the hour, that quality cannot be a variable—an *A* job, a *B* job, or a bare passing *D* job? Does he know that each task consists of many individual operations, but if it is well done it has a rather exact minimum number? Does he know that these operations can often be done in several sequences, but there is usually a right sequence for economy in time, materials, fatigue, and supervision? Does he know that lack of success never indicated failure in all operations, but usually in only one or two details; and that to succeed he need only correct the faulty details and duplicate the details done correctly?

If he does not know these things he must be taught, and the shop teacher—whatever shop it may be—is the ideal man to do it.

2. Form good work attitudes.—Does the boy accept responsibility, and having accepted it, carry it out, or transfer the responsibility to other shoulders if necessary? Does he know the value of honesty, loyalty, cooperativeness, patience, persistence, guts, initiative and confidence? Does he know that failure in these qualities—work attitudes—is responsible for twice as many job separations as lack of ability to do the job?

Your shop may be a laboratory for developing work attitudes. Why leave it to the coach?

3. Develop job background.—What do these boys know about their trade? Do they know its vocabulary, the trade classifications, and the purpose behind each skill? Do they know about the traditions, the high purpose, and the romance of the business to motivate their interest? Do they know enough about the whole job to appreciate their contribution to the product?

If the answer is "no," someone has a job. Could it be you?

4. Provide tool knowledge.—Do the boys have adequate tool knowledge, whether it be English; art facilities; knowledge of physical phenomenons such as gears, cams, levers, pressures, and light; chemical relationships; and other scientific theory that is significant in the trades?

If not, where could they get it better than in the schools? Much of this may be said to be an academic objective, but there is a big step between the theory of the classroom and the practice in industry. The most adept student at solving a problem of mechanical advantage on the blackboard might not recognize the same problem on a press in the form of a gear or lever. The school shop is the bridge across the gap. In fact, this is its most immediate task.

Let us cite an example. These are simple facts reiterated in every high-school science book: That color is light—or the psychological response to light. That all hues combined form white light. That white light may be formed by combining the three primary hues—red, green, and blue-violet. Yet we have wasted unnumbered hours preparing modern printers to cope with current color problems because of misinformation and black magic they have accumulated on this subject. By cooperation between academic and shop teachers, vital subjects such as English, physics, chemistry, or art may be motivated. By the same token, shop courses may be made more challenging to the brighter student.

One shop teacher deplored the fact he could not furnish industry with high-grade prospects because his principal discouraged the brighter boys from taking shop courses. I immediately wondered if he had placed the blame properly. Could it be that his shop offered no challenge to the bright, problem-solving student?

Some problems industry can do as

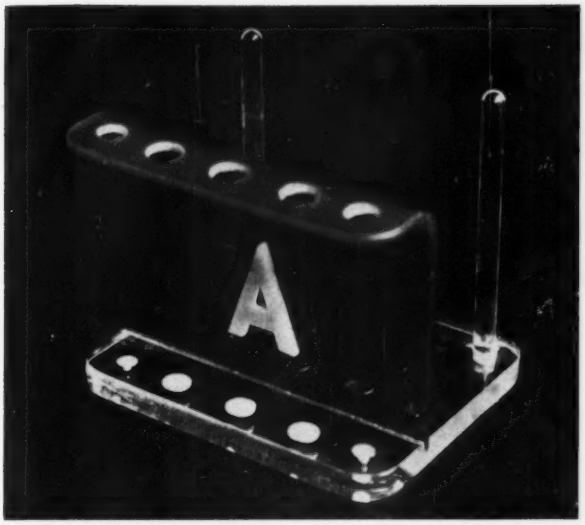
(*Continued on page* 37)

Useful, easy to make, and helpful in developing skill is this

Plastic Pencil and Letter Holder

By Cecil Acuff

Duncan Junior High School
Duncan, Oklahoma

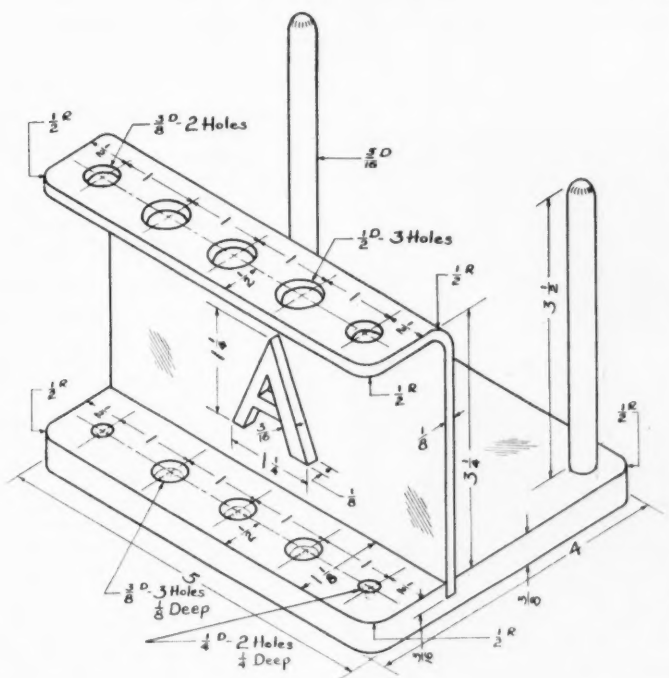


This pencil and letter holder may be made in colors to harmonize with a desk or room scheme. The base is clear plastic and the upright is green translucent.

A PLASTIC pencil and letter holder makes a useful and attractive accessory for any desk or table. Making it in the school shop means not only that the pupil will have a worthwhile take-home project, but he will also develop skill in the use of plastics—cutting, sanding surfaces, polishing, and cementing. The project also provides enough latitude to allow him to express his individual creative ability.

The holder may be made in colors to harmonize with a desk or room scheme. A clear transparent base and a green translucent upright piece was used in the model shown.

The holder for pencils and pens should be drilled in the upright piece first, which may then be used as a template for laying out the holes on the base. The size and number of holes may be left to the preference of the student. In the holder shown, three holes were made large enough to accommodate fountains pens, with two smaller ones for pencils.



Holes in the base for the pencils and pens were drilled with a combination drill-countersink. Before removing the masking tape, all holes, including those for the vertical plastic rods at the back of the base, should be drilled. The radii should be marked and corners rounded and the base slot into which the upright is inserted should be made on the table saw. Care must be taken to get a close fit for the upright piece and in drilling holes for the rods.

The next step is to file, sand, buff, and polish the edges and round the top of each rod. A simple mold for forming the upright piece may be made by rounding one corner of a 2" x 4" block to the desired radius and shaping the plastic around the block by the use of two strips of wood held in the hands.

The project should be trial-assembled before gluing. The initial or monogram on the front may be glued after all other steps have been completed.

A great deal of variation may be used by altering the height of rods and upright, depth of base, or thickness of base. By allowing the base to project slightly further to the front, internal carving in the base would add to the beauty of the project. ★

The work involved in making this visual aid pays off in making teaching more effective

Demonstrator Simplifies TV Training

By Norval F. Fell

Fordson High School, Dearborn, Michigan

TV CIRCUITS are complicated at best, so the teaching of them and the training of TV servicemen presents an involved problem. A compact chassis is an involved hodge-podge of wires and components so a spreading out of the circuit over a larger space is one way of helping students understand it better.

Demonstration panels are helpful in teaching radio circuits and the same applies to TV, as all of a television chassis' component parts can be brought into view on a large board where they can be clearly labeled and the schematic pattern illustrated.

Some simplification can also be achieved by breaking down the various circuits into separate units which are marked out on the panel.

The demonstrator shown here was built at the Fordson High School, Dearborn, Michigan, for use with day trade and evening classes in television, electronics, and TV servicing. The details were worked out by the author and the approximate cost of the unit was $300.

The set features the RCA-630 TS circuit in conjunction with a 16JP4-CRT. The 630-TS chassis was purchased in an unassembled kit which is widely advertised. Some savings could be made by constructing it from old TV receivers.

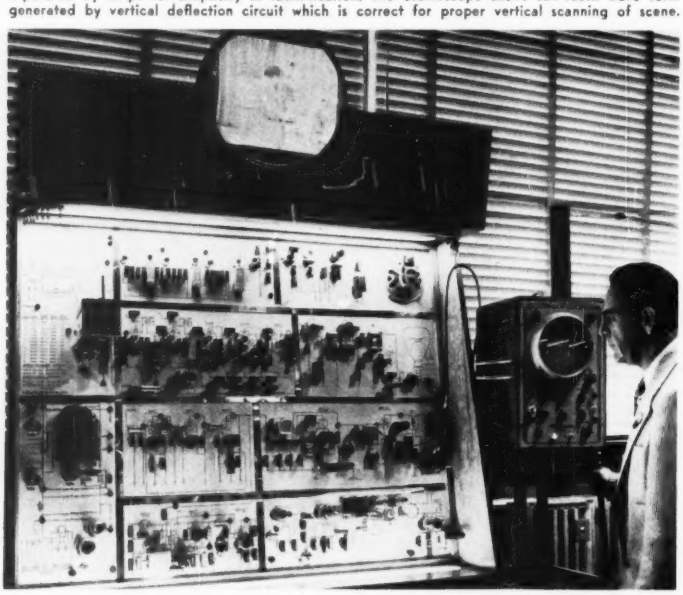
The component parts were reassembled on a 3′ x 4′ panel with the wiring concealed behind the front panel and the terminal points brought out to pin-jacks. All resistors, capacitors, etc., were fitted with tips to be plugged into appropriate pin-jacks on the panel.

The entire unit constitutes a giant-size operating television receiver with all parts exposed so that they can be easily seen by groups of students. Many pin-jacks are provided in the circuit for operation of a signal generator, oscilloscope, or voltmeter.

A wide variety of troubles that affect circuits can be simulated on this panel by quickly substituting wrong or defective parts. The results of these troubles show on the screen, on an oscilloscope, and on a voltmeter.

The demonstrator graphically discloses the effects of component failure on both sound and picture. By placing a shorted or leaky coupling condenser between the plate circuit of the vertical oscillator and the grid of the vertical output tube, a fold-over can be produced on the bottom of the picture. A fold-over at the left side of the picture can be produced by leaving an open capacitor between the cathode of the horizontal output tube and the 100-v bus. These are two of the common TV problems that can be illustrated for students.

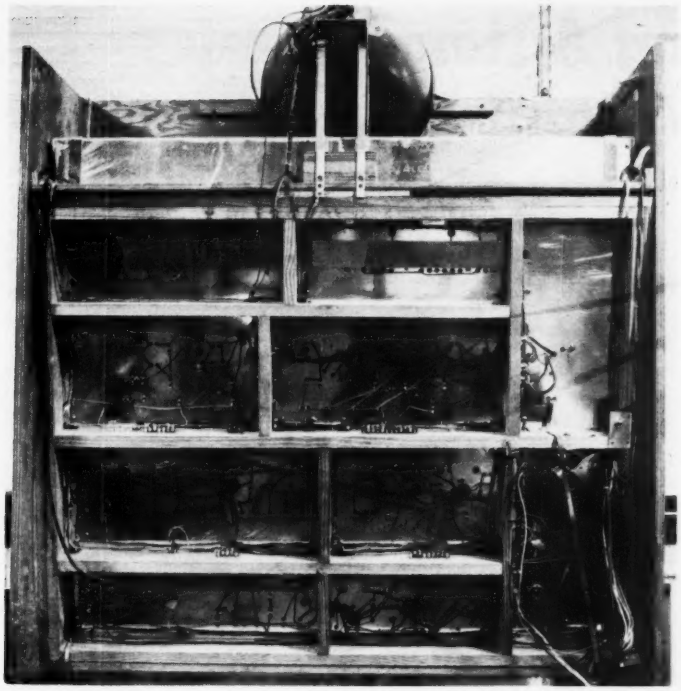
The dynamic demonstrator being operated by the author. Note how the ten different circuits are separated by strips for simplicity in identification. The oscilloscope shows saw-tooth wave form generated by vertical deflection circuit which is correct for proper vertical scanning of scene.



Stripping Divides Panel

To help the student see what part of the circuit is under test, the panel is marked off with stainless-steel strips into ten important functions of the receiver circuit.

The divisions shown on the panel are: (1) front end (rf-oscillator-converter); (2) sound i-f and detector; (3) a-f amplitude; (4) video i-f and detector;



Rear view of demonstrator showing construction details and wiring. Note that all components are on front side with wiring only on rear side so that components may be worked on easily.

(5) video amplitude and d-c restorer; (6) synchronous sep.-clipper amplitude; (7) vertical oscillator and output; (8) horizontal oscillator and automatic frequency control; (9) horizontal output and high-voltage rectifier; and (10) low-voltage rectifier.

In most instruction we are concerned with one function at a time, so the stripping helps the student to concentrate his attention on that one part of the circuit under analysis and he is not bewildered by the maze of circuits of the entire receiver.

Possible Demonstrations

Following is a list of some of the demonstrations that can be performed with the panel and an alignment generator, oscilloscope, and voltmeter:

Front end alignment-response curve.
Pix i-f alignment-response curve.
Over-all r-f alignment-response curve.
Sound discriminator alignment-response curve.
Vidio-amplifier: frequency response; defective peaking coils; wrong value of peaking coils; defective or wrong value of resistors and capacitors.
Composite picture signal—one field.
Composite picture signal—one horizontal line.
Horizontal synchronizing and blanking pulse.
Vertical synchronizing pulse group.
Vertical oscillator wave-form analysis.
Horizontal oscillator wave-form analysis.
Effect of separated synchronizing pulse on control of vertical and horizontal scanning oscillators.
A-f-c wave forms.
Saw-tooth wave forms.
Effect of linearity on saw-tooth wave forms.
Effect of hum in picture channel.
Effect of hum on synchronization.
Effect of defective or wrong-value parts any place in circuit.

Demonstrator Used as a "Guinea Pig"

Many kinds of defects common to most TV receivers can readily be introduced in the demonstrator, thus furnishing the student a problem in finding the trouble. Practice alignment, for the student who needs training in alignment and operation of test equipment, can be made with ease because each component part is mounted beside its schematic symbol and test equipment can readily be connected to the circuit through pin-jacks.

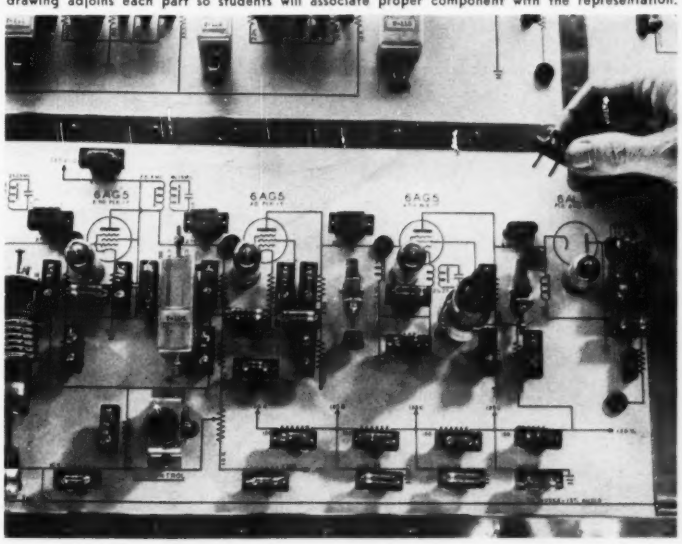
The student can quickly learn the function of the controls which are normally located on the rear apron of a standard TV chassis. He can operate them and observe the response on the c-r tube picture which cannot be done on a regular set. This helps in learning the correct setting of the controls.

Adaptations can be made of the demonstrator for the new u-h-f channels and for color television, if and when it is in general use, by setting up extra circuits on the board.

With its varied uses, the dynamic demonstrator is becoming a vital visual aid in TV training.

While a conservative estimate would place the hours of work required to build the demonstrator at about 300, my only answer to the query of whether or not the job was worthwhile is to say that I couldn't teach an effective TV course without it. ★

Close-up of picture i-f panel shows how component parts may be easily plugged in so that bad parts can be used to give practice to students in locating and fixing them. Note how schematic drawing adjoins each part so students will associate proper component with the representation.



Teaching Automechanics Without a Car

A Four-Semester Industrial-Arts Program

By Harold T. Glenn

Jordan Junior High School, Long Beach, California

AS an instructor in industrial-arts auto essentials, ask yourself these questions: Have I organized the activities of my pupils in a manner that will help me attain the desired objective of contributing to their general education? Or am I merely keeping the pupils interested and busy?

The question of the organization of an activity program such as auto essentials is an important one. An auto-shop activity program either can be organized carefully, covering the necessary units one by one in a psychological learning order, or it can be administered haphazardly. The latter type of program is likely to apply to those shops in which the students are allowed free rein to work on their own cars. Repairing students' cars precludes any specific psychological learning order. *Automobiles simply do not break down according to the laws of psychology.*

Several methods of organization are possible to teach industrial-arts auto classes without having cars to work on. Some teachers arrange the course into a science class consisting of lectures and demonstrations. While this puts order in the course, it tends to lower the interest level. It may become devoid of sufficient student activity actually to call it an industrial-arts course.

At the other extreme is the shop program which is nothing but an interesting hobby type of activity. Somewhere between these two extremes lies a type of organization which can present an interesting and wholesome activity for all nonvocational students.

A carefully organized industrial-arts program achieves its objectives most easily by having a set of projects arranged in a psychological learning order. A program so organized provides for a maximum of activity time spent on dismantling automotive units for a study of the *theory of operation* or *scientific principles involved*, rather than the repair of such units. And these units should be an *integral part of the shop equipment*, rather than having to depend on students' cars to supply the working projects.

Such an activity program can be organized in either of two ways. Duplicate projects can be furnished each student, or each student can be rotated through an assigned set of projects. Where duplicate equipment is available, the entire class can be kept together. This has the advantage of presenting opportunities for timely lectures, demonstrations, and visual aids. Its great disadvantage is the large amount of duplicate equipment needed.

The second method where each student is rotated through a series of assigned projects, is usually more feasible. The author has operated such a plan successfully with the assistance of selected students trained as student instructors.

This method has certain advantages. In the first place, duplicate material need not be stocked, quite an advantage when one considers the multitude of small items needed as replacements for the parts normally broken and lost by unskilled hands. Second, the teacher is free to supervise the entire program, rather than being tied up continuously by the trivial minutia. Third, a chance for *social interaction* and *leadership training* offers itself, which is not possible with other methods of class organization. And last, trained student personnel insures that the working parts of each project are assembled correctly so that the next student will find the project in good working order.

Student instructors find time to complete their assigned projects if trained

Fig. 1—An automobile wiring stand, which provides an exposed mock-up of car wiring for student study. The numbers refer to the numbered instructional steps in the instruction sheet issued to supplement the text.

Fig. 2—A front-end stand. All front-end measurements and adjustments can be made on one wheel without the need of bringing in an automobile to work on. Cleaned-up equipment eliminates the need for overalls.

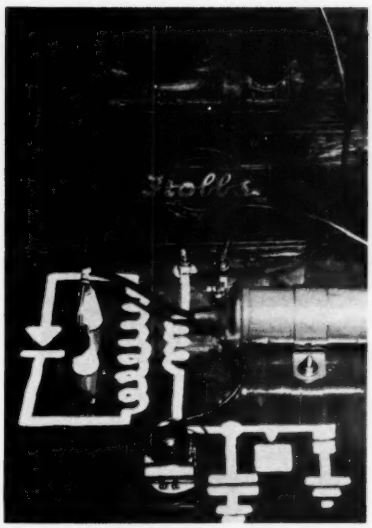


Fig. 3—An ignition board. Note the schematic diagram to assist the student in making the correct hook-ups. The breaker points can be opened and closed by turning the knob on top of the cam. The high tension cap can be varied to study the spark with and without a condenser in the circuit.

in pairs. In this way they alternate with their partners in supervisory work and assigned class work. After an initial training period, these student instructors see to it that every student is assisted through the project being studied.

One of the techniques found useful by the author in placing this cooperative plan in operation is specially built stands containing all the necessary equipment in a permanently mounted arrangement. Such constructed equipment as the wiring stand (Fig. 1) provides an exposed mock-up of car wiring for student study. A similar rack holding four different kinds of hydraulic brakes and front-wheel mechanisms, connected with copper tubing to a master cylinder, provides ample equipment for such jobs as brake adjustment, bleeding hydraulic lines, etc.

A front wheel, mounted as in Fig. 2, allows for all front-end measurements and adjustments (with the exception of toe-in) to be made without the necessity of bringing in an automobile. Equipment boards provide a permanent place to keep small pieces necessary to perform an experiment, such as an ignition board. (Fig. 3.)

Detailed instruction sheets are very desirable in such a program to assure uniformity with student instructors. These instruction sheets are made more valuable by the addition of illustrations and drawings to supplement the text. A useful technique is shown in Fig. 4. Letters identify the parts of a carburetor, which correspond to the lettered dismantling instructions of the text. This makes the instruction much clearer for the students.

Another technique found valuable is the use of individual and group progress charts. The group chart, always kept on display, provides a stimulus to those students who respond to competition. It also provides a handy space to record the names of the student instructors, so that each student knows to whom he must report for assistance for each project. The individual progress chart, kept in each student's notebook, provides a place to record the signatures of the student instructors and teacher when a reading assignment or work project has been completed.

The scope and sequence of the course parallels the experiences of the average youth in regard to the automobile. His first experience is to learn to drive, followed by his purchase of a used car, which he learns to care for in a nontechnical way. He continues through an exploratory technical study of the units of the automobile to broaden his understanding and knowledge. If he is mechanically inclined, the student will find the course a distinct aid in helping him to make a more intelligent decision regarding his *life's* work.

Complete coverage of the material is possible in four semesters if the class is elected on a one-hour-per-day basis. The first semester covers the introductory units of driver and consumer education. To be of most value, these units should be given in the tenth grade, or just before the boy obtains his driver's license. The next three semesters cover the more technical units of engines, electricity, and chassis.

The outline of the course content for the four semesters is as follows:

Driver Education
The basic physical driver qualifications.
The basic mental driver qualifications.
The elementary principles and techniques of driving.
The expert driving techniques.
Traffic laws which all drivers should know.
Traffic laws made by nature.
Civil code laws which all drivers should know.

Consumer Education
How to purchase a used car.
How to care for the finish and upholstery.
How to care for the mechanical condition of the car (preventive maintenance).

The Operating Principles of the Automobile Engine
Lubricating systems.
Cooling systems.
Valve mechanisms.
Pistons, connecting rods, and crankshaft assemblies.
Valve timing mechanisms.
Fuel systems.

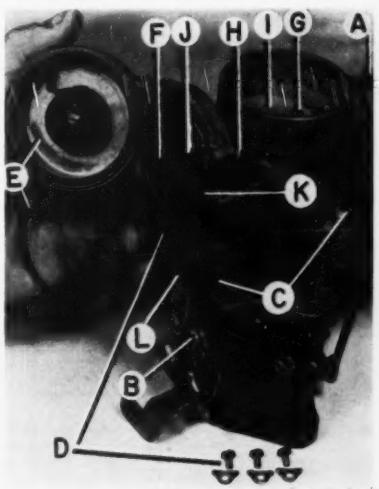
The Operating Principles of the Electrical System of the Automobile
Magnetism.
Electromagnetism.
Measurements of electricity.
Induced electromotive forces.
The storage battery.
The lighting system.
Starting motors and generators.
The ignition system.

The Operating Principles of the Chassis and Drive Mechanism
Springs and shock absorbers.
Drive mechanism.
Clutches.
Transmissions (including automatic transmissions).
Front axle and steering mechanisms (including power steering).
Brakes.
Instruments.

There is a place for working on cars in such a program *after* a student has completed the required course of study. Normally only the most able students will have completed the required work. These are usually able to work on their own cars with a minimum of teacher supervision. Such additional live-work assignments prove interesting and stimulating to the capable students and makes completion of the required work a worthwhile goal. ★

(Illustrations used in this article are from *Exploring Automechanics* by Harold T. Glenn, published by Charles A. Bennett Co., Peoria, Ill., 1952.)

Fig. 4—A useful teaching technique. An illustration of the carburetor disassembly, which can be used as part of an instruction sheet. The letters correspond to the letters of the dismantling instruction of the text.



Prexy Said "YES"

By Clarence T. Baab

Professor of Industrial Arts,
Colorado State College of Education, Greeley

When commercial sources did not have the right equipment for this drafting room, these tables and cabinets were made in the school shop. Drawers will fit either the tables or the cabinets.

TWO summers ago, the educational representative of a large hand- and power-tool company stopped by on his annual call to show summer-school students his line of tools and also to show what new tools had been developed during the year just past.

Among the visitors viewing the tools and demonstrations was Dr. William R. Ross, President of Colorado State College of Education. The factory representative demonstrated a new jig and cutter to be used on a power router to cut dove-tail joints for drawer corners.

He permitted the college president to use the power tool and jig, and soon Dr. Ross was back with the two school carpenters. He told the carpenters he would buy them one if they could make use of it. They agreed they could use one, and a dove-tail cutter, jig, and router were ordered.

A few weeks later, a problem arose in the drafting room of the industrial-arts department as its capacity had to be enlarged to 35 from 20. The old flat-top tables in use were three times larger than necessary and were too low, even with 10″ leg extensions. A search was made for tables and storage cabinets that would meet the requirements of the room, but none were found. In the first place, each drawer had to be large enough to store 18″ x 24″ paper, an 18″ x 24 ″drawing board, 24″ T-square, two triangles, rule, and a set of drawing instruments in addition to a textbook. Also, the drawers had to be deep enough to allow a bottle of India ink to stand up.

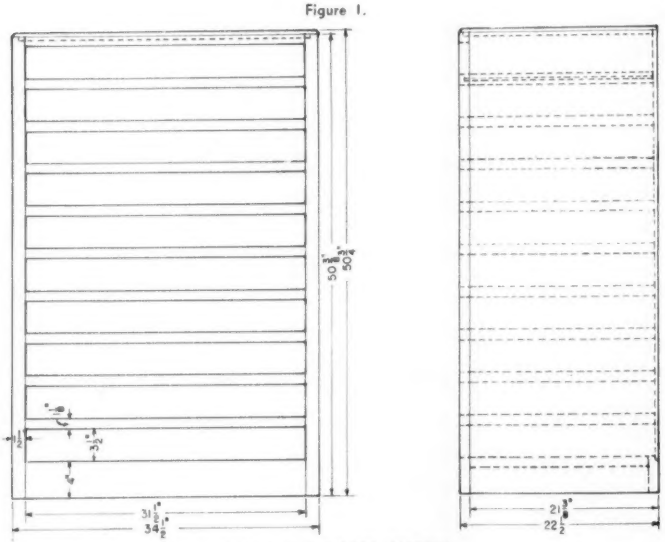
Because the furniture desired did not exist commercially, it was decided to have the school carpenters make both the storage cabinets and drafting tables. The finished storage cabinets and tables are shown in the photograph.

1. The Drawers

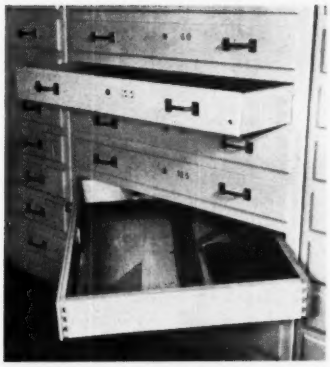
It was estimated that 14 storage cabinets holding 10 drawers each and 38 tables with storage drawers were needed to house 6 college classes and a high-school class taught for the laboratory school. This made a total of 178 drawers that had to be constructed. The school carpenters so enjoyed using the power tool mentioned above that they dove-tailed each drawer on all four corners, making a total of 178 x 4 or 712 dove-tailed drawer corners. One of the photographs shows one drawer pulled out and set-in at an angle to show the dove-tailed corners of the drawer. The drawers were made identical, as it was first thought that they would be used only in the storage cabinets and each student would carry the drawer to the desk, and then at the end of the hour carry the drawer back to the cabinet. It was soon found, however, that the drawing board and all equipment, including a book, could be carried more easily without the drawer. One of the pictures shows a close-up of a table with drawer 10C inserted in the space provided for it. This same drawer, 10C, is shown in the picture of the storage cabinet.

The drawer fronts were made so that they had a ½″ lap on the top and sides and were made *flush* on the bottom. All the drawers were made to fit into an opening 3½″ x 31½″. The length of the drawer sides was 21½″. The drawer

Figure 1.



DRAFTING STORAGE CABINET



A total of 172 dovetailed drawers were made like these. Note locks and numbers on front.

bottoms were ¼" masonite or ¼" plywood. The drawer fronts were rounded off when they were completed with a ¼" curve made by the router and bit. Two drawer pulls and a lock were installed after each drawer front was painted with the finish coat. Foundry letters and figures were applied with two small brads, and all of the equipment in each drawer was marked to match the drawer number.

2. The Storage Cabinets

Figure 1 shows a drawing of the storage cabinet without the drawers, whose size and description were given above. The top and sides were made of ¾" material while the drawer slides, front trim, and front and back rails were cut from 1⅛" material.

A detail section of the side construction through the center of one of the drawer openings is shown in Figure 2. Ten 1⅛" dadoes were ploughed 5/16" deep into each of the two sides of each cabinet. This permits the slides to be glued into each of the sides.

The back edge of the top and the back edges of the two sides were rabbeted out to take a ¼" masonite or plywood back panel. The drawer slides were cut 1¾" wide while the front rails were cut 2" wide. The front and back rails were cut to length so they could be glued into the previously cut dadoes for the slides, as shown in Figure 2.

The back rail was cut 1½" wide and this much space was allowed from the rabbeted space for the back for gluing the drawer slides into the dadoes cut for same. After the slides were glued, the drawer guides were cut from ¾" material and were glued and nailed to the slides with 4d finishing nails.

An added feature of the cabinet is that before the front and back rails and drawer slides were installed, each piece was dadoed out ¼" so that nine pieces of ¼" material could be inserted before the back rail was installed. This makes it impossible to "reach through" from one drawer opening down into another drawer.

A corner of the front rail was cut out to accommodate the 1⅛"x 1½" corner stile, as shown in Figure 2. These corner pieces were installed by gluing and nailing with 8d casing nails into the sides and the cut-out corners of the rails (Figure 2).

The four edges of the top and the two front edges were rounded off with a ⅜" cutter in the router.

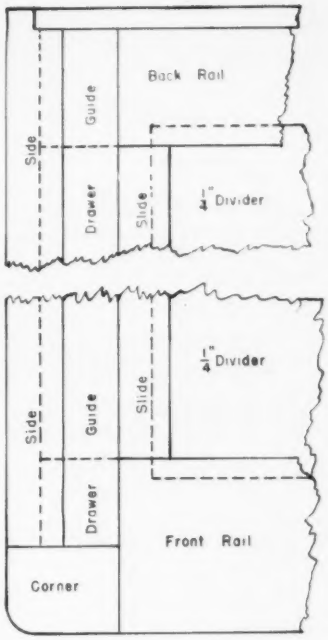
3. The Drafting Table

Plans for the drafting table with the adjustable top are shown in Figure 3. The exact size of the top is shown, including a 5/16"x 1¼" maple strip around the edges of the top. Before the edging was applied, a ⅛" piece of tempered masonite was glued to the ¾" top. The "subtop" is also made from ¾" material and the side rails installed through the use of the mortise-and-tenon joint. After the top was cut to size and the edges jointed, the maple strips were applied with 1¼" No. 6 oval-headed nickel screws. A miter cut was made at the corners.

The 8½" table adjustment hardware may be purchased at any large hardware supply house or commercial school furniture manufacturer. The stud bolt which is screwed into the leg has a ⅜" thread bolt on which a wing nut is used to tighten for angle adjustment. Two 3½" T-hinges were used to make the top adjustable.

The 1½" galvanized pipe was purchased threaded at both ends. Regular pipe flanges for this size pipe were used to fasten the foot rails. The router with the ⅜" bit was used to round the four edges of the legs before assembly began.

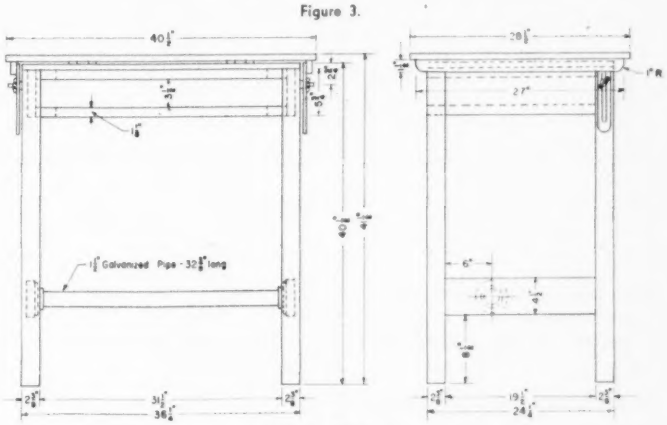
Stools of 30" height were purchased to go with the tables. Ten of the stools were ordered that could be adjusted either higher or lower for students who were taller or shorter than average. ★



DETAIL OF SIDE THROUGH CENTER OF DRAWER SPACE

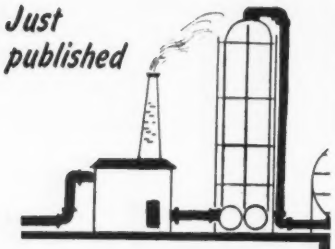
Figure 2.

Figure 3.



DRAFTING TABLE

Just published



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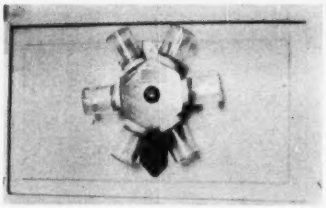
An ideal project for the lower grades

Nail and Screw Container



Nail and screw container mounted and ready for use. Sizes can be labeled on jar or frame.

By Harold O. Akeson
East Orange, New Jersey, High School

THERE is always a demand around the house for nails, hooks, or screws for repairs and varied reasons. When the need arises, it is not uncommon in the average home to search every nook and corner for the desired material. A definite place for small hardware is just a part of good housekeeping.

This particular project lends itself very conveniently to home needs. It is an ideal job for the lower grades having shop work, is very inexpensive and would be useful as a gift on suitable occasions.

Make the wood parts first, using any soft wood. Two pieces are needed, one $\frac{3}{4}$" x $3\frac{5}{8}$" x $3\frac{5}{8}$" and the other $\frac{3}{4}$" x $1\frac{5}{8}$" x 9". By having the material thickness planed and prepared in rough sizes to hand out to each student, the work is simplified a great deal, especially where the classes are large. The hexagonal piece, $\frac{3}{4}$" thick, may be handled in two ways. For the lower-grade group, a templet would be the best solution for obtaining a perfect looking hexagon. With older students, it would be good experience to lay out the shape. A square piece may be preferred to the hexagonal shape. Of course the change in shape reduces the number of containers but makes the problem less complicated for the student.

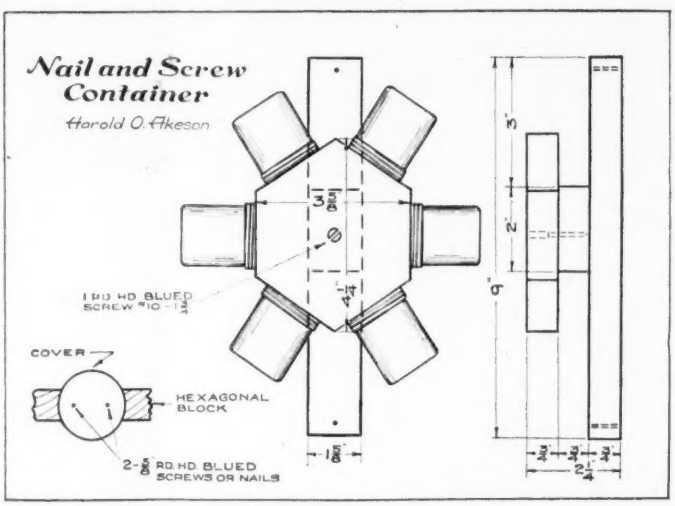
After sanding all the pieces, the two rectangular blocks may be glued and nailed together.

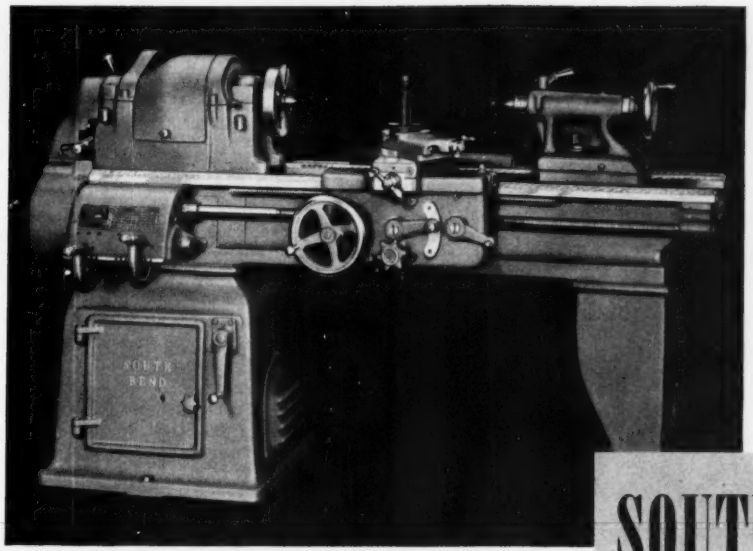
For the block that is to revolve, find the center and drill a hole slightly larger than is required for a #10 round-head blued screw.

Glass containers with a metal screw top should not be difficult to obtain with the variety of concentrated foods that are on the market today. Jars larger than 2" in diameter and $3\frac{1}{4}$" tall are not recommended. Jars $1\frac{1}{2}$" x $1\frac{3}{4}$" are ideal. Increase the thickness of the intermediate block $\frac{1}{4}$" if using large jars.

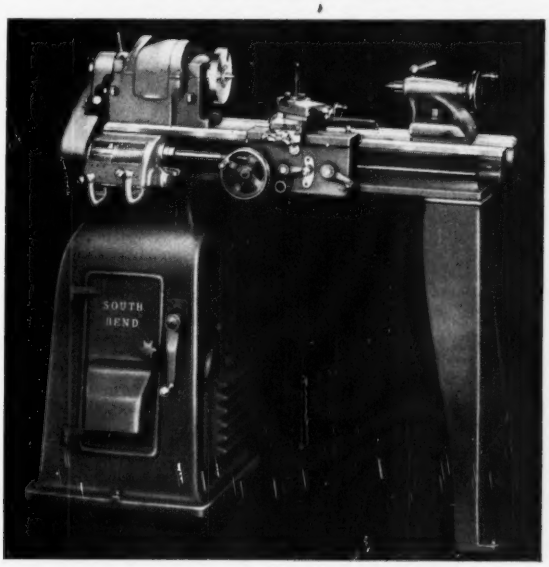
Use either flat-head nails or round-head screws to fasten the jar tops to the block.

After painting and assembling, the job is ready to take home. The student should be encouraged to select a paint color that would be in keeping with the color scheme where the project is to be used. ★





16" x 6' QUICK CHANGE GEAR LATHE



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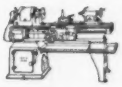

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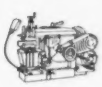

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Frosting Headlight Lenses

Here is a suggestion on how to frost lenses for auto headlights. With a strong solution of epsom salts, paint the inside surface of the lenses and let dry. This frosting can easily be washed off any time with hot water. If a permanent frosting is desired, rub the surface with a fine emery paper.—*B. R. Harrison, Booker T. Washington High School, Columbia, S. Car.*

Value of a Shop Card

The shop card is a valuable asset for good shop supervision and administration. It eliminates money handling by shop instructors and does away with tedious records of materials sold to each student.

At the beginning of the school year, a student buys his shop card at the principal's office; he brings it to his shop instructor who files it in his office. As the student uses materials, the cost of the various items is punched out of the card.

When a student uses up his card he is required to buy another one. If he doesn't use his card up, he gets the proper refund from the principal's office at the end of the school term.

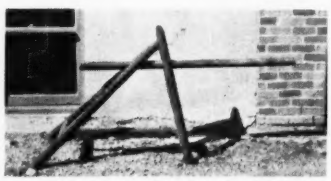
The cards are also valuable in collecting for broken or damaged tools or wasted materials caused through the student's negligence.

Shop cards can be printed at the local print shop or in the school print shop. A 3x5 card is a convenient size. It can be printed in $2, $5, or any denomination that suits the needs of the instructor.

The wording on the card can be suited to the instructor's wishes, but there should be a place for the student's name, date of purchase, instructor's name, and name of school.—*Edward Barski, Stillwater, Minn., Public Schools.*

Welded Pipe Stand for Working Sheetmetal

For working sheetmetal in cylindrical shapes, a welded pipe stand of 2" pipe, as shown, can be used.



A dented roof drain or section of stovepipe is slipped over the protruding top section of the pipe, giving a smooth curved surface on which to hammer out dents.—*E. V. Reyner, Townsend, Mont.*

Safety Hint for Table Saw

In order to keep students from looking over the saw blade in the woodshop and to keep fingers away from the saw, paint a line the thickness of the saw blade in front of it on the saw table. This will serve as a guide for placing wood in the proper position for sawing.—*Sam Madia, Suncrest Flatts Junior High School, Morgantown, West Virginia.*

To Increase Printing Speed

Pupils can usually feed a press faster than they can pick up sheets from the feedboard. In our graphic arts laboratory we have found that a small cloth soaked in glycerine and placed in a jar cover is a handy thing to have around. By touching his fingers to this rag, the pupil is greatly facilitated in picking up single sheets.

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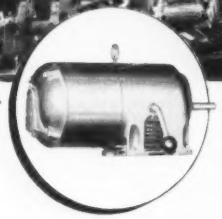

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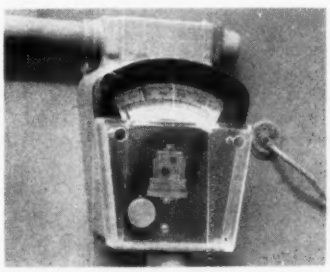
The glycerine-soaked rag is also handy to have around when collating sheets (gathering pages for booklets).—*Herbert B. Downs, John W. Weeks Junior High School, Newton Centre, Mass.*

Protective Indicator Cover

Included among the physical facilities of all school and industrial shops are machinery and equipment which require careful and exact adjustments to insure effective work operations and for safety precautions. Included among such equipment are heat-treating ovens, vacuum forming equipment, hydraulic presses, compression and injection molding machinery, and any other equipment in which heat and pressure are predetermined and set before working operations are begun.



To eliminate any temptation on the part of the student or worker to readjust the indicators on these pieces of delicate equipment, they should have a transparent plastic protective safety cover.

The cover shown in the photograph above proves very effective for this purpose. The design, size, and installation of this cover, naturally, will depend on the type and style of adjustment indicators on the various types of equipment.—*Andrew R. Kosher, Kingston, Pa., Vocational School.*

Sharpening Wood Gouges

Oftentimes instructors and students have difficulty in putting a keen cutting edge on wood gouges by the use of the slip stone. I have found that a razor-like edge can be put on gouges or any other keen-edged cutting tool after a little practice by the following simple method:

1. Grind tool if necessary.
2. Hone on stone to remove burr.
3. Finish by placing the tool on a small cloth buffing wheel on which buffing compound has been added.

This method of sharpening tools gives an ideal cutting edge, especially on wood gouges, where it is difficult to hone the inside curved edge.—*Claire Floutz, Lakeview Junior High School, Battle Creek, Mich.*

For that Well-Groomed Look

Almost everyone has used a cloth to apply a wood stain. It saves cleaning out a brush and it spreads the stain more evenly. Even after using a brush, one frequently smooths out the stain with a cloth.

Here is a hint for cleaning up your hands after using the cloth. Simply put cold cream on them before the operation. After the stain job is completed and the cloth is disposed of in the safety can, wipe off your hands and wash with warm water and soap. Cleaning up is much simpler by this method, and the cold cream is good for the hands, too.—*William D. Chatfield, Teachers College of Connecticut, New Britain.*

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By Noble H. Poole

Emmerich Manual Training High School, Indianapolis, Indiana

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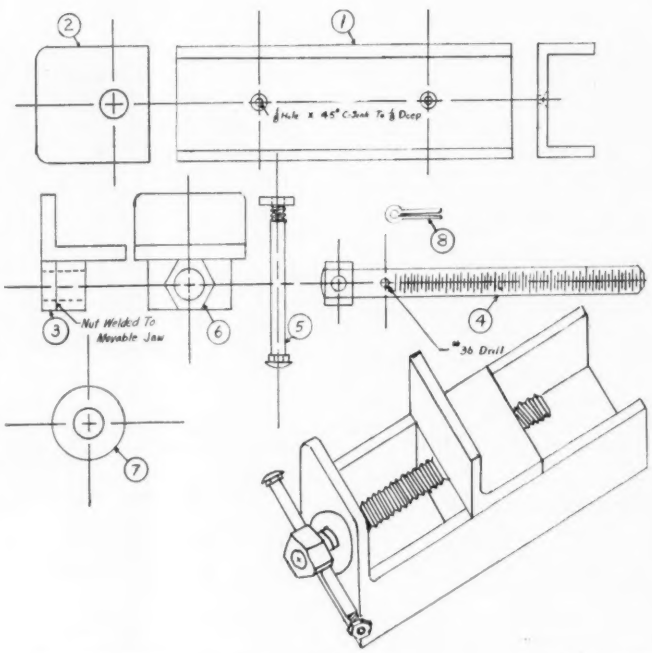
Construction details are evident from the drawing and picture.

After the hex nut (part 6) is brazed to the movable jaw and the metal has cooled, start a ½" tap through the nut and continue the threads into the jaw so that the screw will operate smoothly.

When the job is completed and cleaned, an attractive appearance can be achieved by enameling all the parts except the screw and nut threads. The screw and threads can then be lubricated and the vise is ready for use. ★

Part No.	Part Name
1	Ship and car channel 2 x 1 x 3/16 x 6
2	Back jaw 2 x 2 x ¼
3	Tee 2 x 1½ x ¼ (movable jaw)
4	Screw ½ x 5¾ x 13 threads
5	Carriage bolt ¼ x 3
6	Hex. nuts ½ x 13 threads (2 req.)
7	Washer ½ id x 1¼ od x ⅛ (2 req.)
8	Cotter key ⅛ x 1



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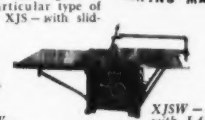

XJSW — with J-430 extended sliding table at left

XJW — with J-420 removable roll-table at left

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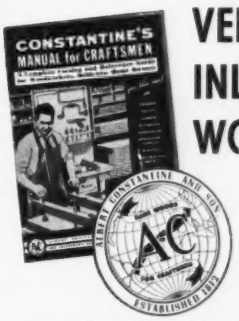

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News

HAPPENINGS IN INDUSTRIAL EDUCATION

Special Awards Winners

TEN of America's outstanding young craftsmen, selected from the 31 top winners in Ford Motor Company's 1953 Industrial Arts Awards program, were given special recognition on Sept. 26 at a banquet at Dearborn Inn, Dearborn, Mich.

The Special Awards were won by George W. Sterricker, Los Angeles, Calif.; Imre Pagi, Vineland, N.J.; Arnold P. Simkin, Baltimore, Md.; Earl N. Noe and Paul W. Schuler, both of St. Paul, Minn.; Joann M. Nemeth, Manchester, Ohio; Robert L. Pimentel, Redwood City, Calif.; John T. Calhoun, Minneapolis, Minn.; Robert D. Spann, Beaver Falls, Pa.; and John D. Brubaker, Lancaster, Pa.

The awards banquet was one of the events scheduled as part of a five-day all-expense-paid visit to Detroit and Dearborn for the 31 Outstanding Achievement winners and their teachers. A three-man panel of judges who selected the Special Award winners was composed of Robert E. Smith, professor emeritus of industrial education, Ohio State University; Harold S. Vincent, superintendent of schools, Milwaukee, Wis.; and Verne Fryklund, president of Stout Institute, Menomonie, Wis.

Planning Ahead

THE executive committee of the American Industrial Arts Association has chosen Los Angeles as the site for the 1954 convention of the organization. The committee also tentatively decided that the 1955 convention would be held in Philadelphia.

Oregon IE Assn. Officers

LINDSAY Vincel of Toledo has been named president of the Oregon Industrial Education Association for 1952-53. Other officers are Robert Burke of Oregon Technical Institute, vice-president, and Del Jones, O.T.I., secretary-treasurer.

Plan Industrial Trip

THE Alleghany County branch of the Pennsylvania Industrial Arts Association is planning an industrial trip for its December meeting. It will visit the Continental Can plant at West Mifflin.

Heads Machine Shop Group

ROBERT VANEMAN of Cicero has been elected president of the vocational machine shop instructors of Illinois. His duties include the determination of policies concerning the aluminum casting, gray-iron casting, and blueprint pools established by this group. The aluminum casting pool is new this year.

Midwestern Ohio IA Assn.

HARRY ADAMS of Toledo, Ohio, is president of the Midwestern Ohio Industrial Arts Association for the current year. Darwin C. Eaton of Swanton and Harvey Miner of Tontogany are vice-presidents, and Lester Riggle of Defiance is secretary-treasurer. The organization will hold an Administration Night on January 21 at Weston and will visit the General Motors foundry at Defiance on February 18. ★

Convention Calendar

American Vocational Association, Boston, Mass., November 30-December 5.

Illinois Vocational Association, Peoria, March 26-28, 1953.

New York State Vocational and Practical Arts Association, Hotel Statler, New York City, April 23-25, 1953.

Indiana Industrial Education Association, Civic Center, Hammond, April 23-25, 1953.

American Council of Industrial Arts Supervisors, Statler Hotel, Detroit, April 28-29.

American Council of Industrial Arts Teacher Education, Statler Hotel, Detroit, April 29.

American Industrial Arts Association, Statler Hotel, Detroit, May 1-3.

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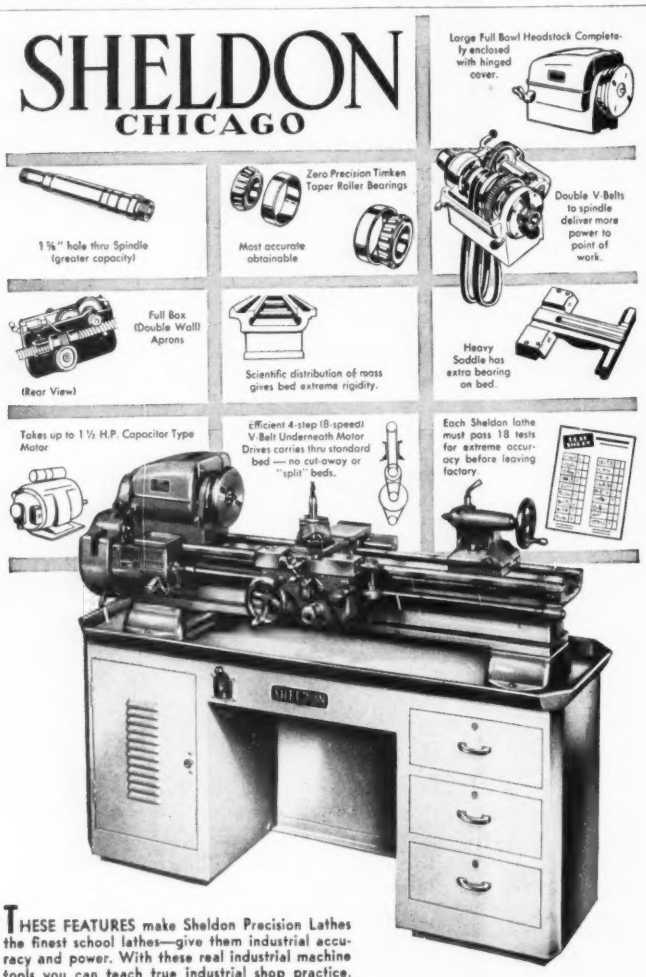
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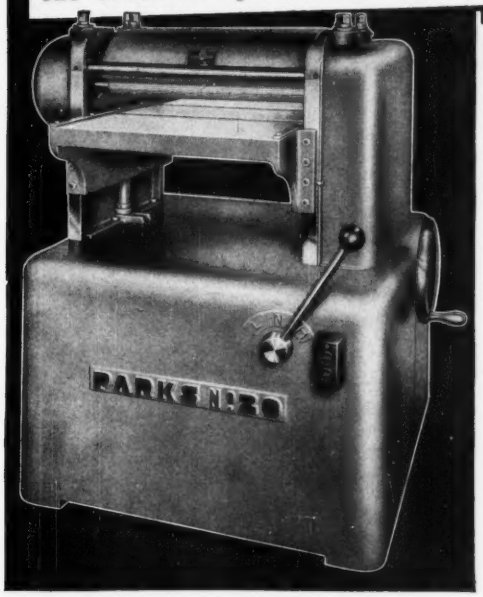

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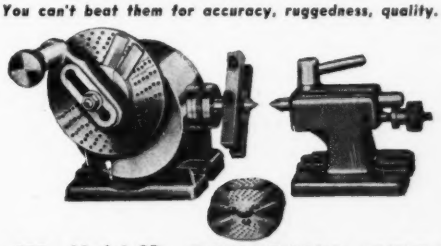

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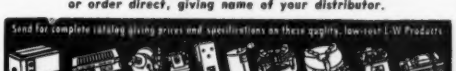

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ABOUT YOUR FELLOW TEACHERS

EDGAR REDMAN, coordinator of vocational trade and industrial education at Hamilton, Ohio, for the past two years, has been named director of vocational education in New Castle, Ind. He succeeds NOEL T. MYERS, who has accepted an assignment as vocational education specialist in the Republic of Lebanon.

JOHN GREER, formerly director of industrial education at Augusta, Maine, is now instructor of woodworking and drawing at Gorham State Teachers College, Maine, succeeding LAWRENCE N. CILLEY. Mr. Cilley retired in June after more than 30 years as instructor at the college.

LESLIE G. STIER, director of the Los Angeles Trade-Technical Junior College, died July 30 at the age of 59. A leader in industrial education for three decades, Mr. Stier was formerly a vocational education instructor in teacher training at UCLA and instructor at the University of Utah.

JAMIE R. WOMACK, former assistant state director of vocational education and supervisor of distributive and trade and industrial education for Georgia, has been appointed director of vocational education in Paraguay.

JOHN L. PETERSON, formerly machine trades instructor at Wadsworth, Ohio, is now teacher trainer in trade and industrial education at Kent State University, Ohio.

R. L. WELCH, formerly chief of trade and industrial education in Wisconsin, is now associate professor of industrial education at Florida State University.

JOSEPH R. ERVIN joined the trade and industrial education staff at West Virginia on October 1 as assistant state supervisor. Mr. Ervin, a teacher at Elkins, W. Va., High School for the last 17 years, replaces ANDREW K. AULT, who is now teaching at University High School, Morgantown, W. Va.

EDWARD S. WESTON is now a supervisor of the Bureau of Vocational Activities for the Department of Industrial Arts, Elementary and Junior High Schools, in New York City, N.Y.

LAWRENCE M. FREDERICK has been appointed head of the industrial-arts department at New Mexico Western College, Silver City. He succeeds HENRY A. WHITE, who has accepted a position with the Kennecott Copper Corporation in Hurley, N. Mex.

FRED W. RATHJEN has been appointed by City College of New York to organize the new transportation shop in the industrial arts department. Mr. Rathjen formerly was instructor at Far Rockaway, N.Y., High School. ★

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By Aaron Adams, Cincinnati, Ohio

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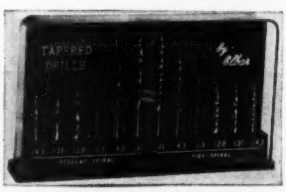

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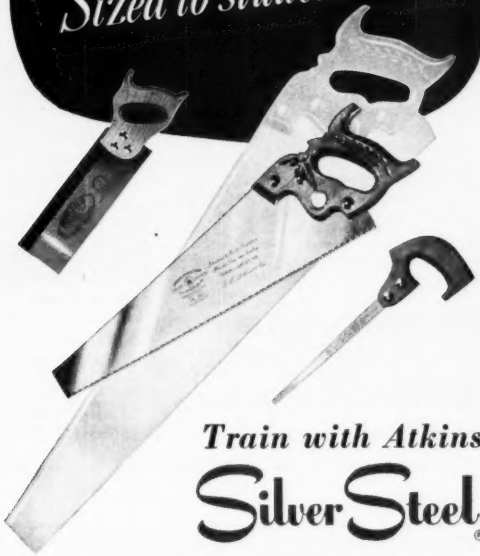

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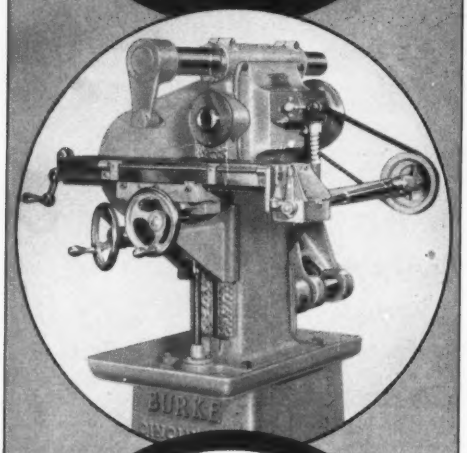

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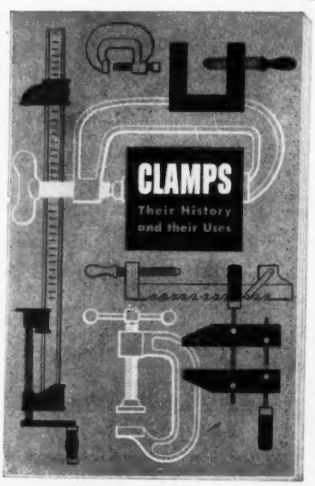

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John W. Raymond
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Dear Sir:

May I express to you my great pleasure at finding in the November SCHOOL SHOP your very fine answer to Dr. Darden's *Look* article. In addition to all the questionable statements to which you directed attention I was concerned about Dr. Darden's apparent confusion in his use of the terms "trade training" and "vocational education."

I only hope that someone in a position to attract the attention of the editor of *Look* will write *him* a letter.

W. K. Dunton, Supervisor,
Trade and Industrial Education,
Piqua, Ohio.

Dear Sir:

I am taking this opportunity to thank you in advance for your "Shop Teachers Service." However, this service is only one of several important services which are rendered shop teachers. Your special safety issue and the October issue have both been particularly helpful to me.

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Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Are They Really Dumbbells?

FREQUENTLY we hear rumblings that intellectual discrimination has become rampant in our public schools. Apparently some shop teachers have discovered that the counselors in their schools are segregating pupils on the basis of their IQs.

There are those who believe that this practice is good and are willing to stand up and fight for it. On the other hand, these shop teachers feel, quite strongly in some cases, that they get all the "dumbbells," since the pupils with high IQs are herded into academic classes while those who supposedly are of lesser intelligence are thrust on the poor downtrodden shop teacher.

Personally, we might have resented this point of view had we been aware of the reason for our assignment when we attended high school. As a matter of fact we were fooled into the belief that we were being honored by being selected for membership in the shop class. It should be said, however, that intelligence tests had not been discovered at that time, and the IQ had not been invented.

Time has passed, however, and in the interval some bright soul has discovered that people differ widely in regard to intelligence. Not only so but it appears that these differences are being expressed in terms of a figure which indicates how an individual stands in relation to his fellows. This disconcerting figure has come to be known as a person's IQ.

There are those who question the validity of these figures, and some take rather a dim view of the whole testing program. Nevertheless, I believe we can agree that people do differ in regard to their intelligence, even though we may not be able to determine specifically the degree of difference. We might agree also that the degree of intelligence possessed by a person might influence his achievement in life.

But there are other factors which effect one's future. For example an individual with a high IQ might not achieve much if he lacked personality, interest, persistence, or the ability to visualize abstract ideas in articles of three dimensions. On the other hand, one with a relatively low IQ might reasonably achieve a great deal if he possessed these characteristics to a high degree.

As an illustration, we recall the case of Mrs. Jones. This lady was a kindly soul and, like many parents, she had conceived the notion that the universe revolved around her Willie. Now Willie was a nice boy but he lacked most of the physical and personal characteristics of a youngster who hoped to play major-league ball, and who worked diligently toward that end.

One evening when Willie's father came home from work, the mother met him at the door and announced that she had just visited Willie's teacher. "And what do you think he told me? Why, our Willie has an IQ of 140!"

"Well," replied the father, "what about it?"

"Why, John, don't you realize that Willie is the most intelligent boy in school? And, think of it, Nellie next door has an IQ of only 90!"

Now Nellie was a comely lass who was in no way inhibited by her status on the IQ scale. She had charm and she knew how and where to use it. When it came to achieving her objective, with all his intelligence, poor Willie didn't have a chance.

There came a time when Willie began to notice Nellie and, in the natural course of events, he found time to visit

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Motor Size	1/6 H.P.	½ H.P.	½ H.P.	¾ H.P.
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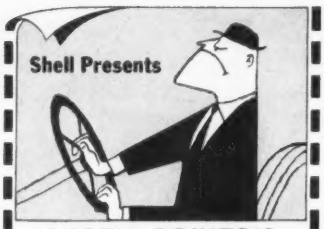

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with her. These visits led gradually to the point where Willie concluded that life without her would be impossible. Those who are sentimental are likely to declare that Cupid shot an arrow into Willie's heart, but we who are more cynical have a suspicion that the real culprit was Nellie.

Willie did not even inquire about Nellie's IQ. Moreover, he didn't care a hoot about it. When it came to handling the situation, little Nellie, with her 90, had Willie, with his 140, running around in circles.

In due course of time the young couple were married and Willie, who was eager to establish himself professionally, decided to begin work on his Ph.D. degree. As he traveled the path and as he viewed the hurdles ahead of him, there were occasions when he was discouraged and despondent. And who was it that provided the encouragement and the stimulation that drove Willie to final success? It was this not-so-bright girl whose IQ was only 90.

From this it would seem to be apparent that intelligence, as measured by one test and expressed by a figure known as the IQ, is only one factor in the attainment of success by an individual. Achievement for a person in any field is more likely to result if he is industrious, if he has initiative, if he is persistent, and if he has an interest in what he is doing.

And so, dear teacher, as these little "dumbbells" file into your class, don't lose any sleep over their IQs. Rather should you acquaint yourself with the characteristics they possess. When you have discovered them, your efforts should be directed toward their development to the point where they will more than compensate for their low score on a man-made measuring stick whose validity might seriously be questioned.

You may have in your class a potential giant of industry, or even of a profession! But—more important—these young people have the potential to become good, honest, productive citizens if you, as a shop teacher, accept the challenge to help develop their capabilities. ★

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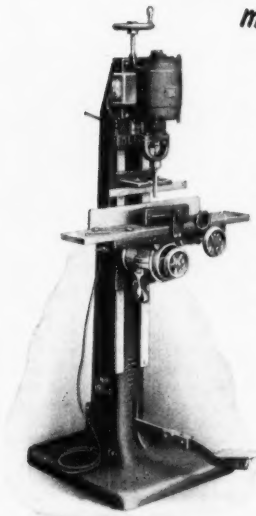

- This "Oliver" makes clean, accurate mortises. And it handles a wide range of work, mortising a pocket for the lock in a 32-inch door. The spindle travels 4½", and takes chisels up to ½" square.
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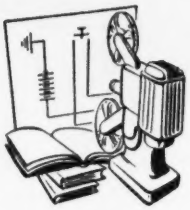

Books:

UHF Practices and Principles. Lytel. New York: John F. Rider Publisher, Inc., 1952. Pp. ix+390. $6.00.

This book is designed for the student or technician who is familiar with the fundamental concepts and techniques of standard broadcast receivers. The first three chapters provide an introductory background by discussing the nature of ultra-high frequencies and how they differ from lower frequencies. Receiving antennas and transmission lines are then discussed; u-h-f tuned circuits are considered, and practical types are illustrated.

U-h-f oscillators are described next and u-h-f commercial equipment is analyzed. Television has a prominent place in the circuit descriptions. Excellent illustrations, along with thought-provoking questions at the end of each chapter, suggest that the book will be valuable as a text for classes in this type of work.

Allan Lytel has had wide experience in this field, and is now employed as a lecturer in electronics at Temple University, Philadelphia.

Motor's Auto Repair Manual. (15th Edition). 250 West 55th St., New York: MoTor, 1951. Pp. 769. $5.95.

The use of this manual has been widespread. By means of clear-cut illustrations and simple descriptions it provides the mechanic with the latest information concerning the repair and maintenance of all the popular types of automobiles used in this country. This issue replaces all earlier editions of the book.

Illustration and Reproduction. Biggs. New York: Pellegrini & Cudahy, 1952. Pp. 240. $8.50.

This book should be of interest to those who are engaged in drawing for reproduction, and to printers, printing students, editors, publishers, or others to whom a knowledge of graphic reproduction is a tool in their work.

Autographic processes such as wood engraving, etching, lithography on stone, zinc, and plastic are explained, and experiments with line blocks are demonstrated.

John R. Biggs has taught typographic design and wood engraving at the London School of Printing, as well as at other prominent schools in England.

Machine Shop Technology. Felker. Milwaukee: Bruce Publishing Co., 1952. Pp. viii+491. $4.80.

This book was prepared to be used as a text in vocational classes, either in a separate trade school or in the vocational division of a comprehensive high school.

The material is organized around shop skills and includes information essential to these skills. Moreover, typical problems in mathematics connected with each skill are included where they apply. The book is well illustrated and it contains at the end of each section a series of short concise questions.

C. A. Felker is Head of the Department of Vocational Education, University of Toledo, Ohio.

General Mathematics at Work. Ewing and Hart. Boston: D. C. Heath & Co., 1952. Pp. vi+266. $2.80.

This is one of the few really practical textbooks on mathematics. It is clear, concise, and teachable and practical from the student's point of view because he can see how mathematics is applied everyday in the world of work. The book is well illustrated by shop drawings, and covers the field from a review of arithmetic up to and including trigonometry of the right triangle. It should serve as an excellent text in any mathematics class, but it will be particularly valuable for vocational classes.

Claude H. Ewing was formerly Director of the Chicago Vocational School. At present he is Director of Vocational Education at the Kamehameha Schools in Honolulu. Walter Wilson Hart is known nationally for his many mathematics texts, and is an experienced teacher.

All About Television. Derby. Chicago, Ill.: Popular Mechanics Press, 1952. Pp. 171. $3.00.

In this book television is presented so as to make it intelligible to the lay reader. By using it as a guide, with its many illustrations, a person lacking experience with electrical equipment will be in a position to purchase a set intelligently, and he should find it possible to install and service it economically for certain types of repairs and when adjustments have to be made. While the book is not arranged to be used as a text it is one that should have a place as a reference in the high-school shop library.

John Derby is a professional t-v serviceman who believes in teaching theory together with its application.

Woman at Work. Anderson & Winslow. Minneapolis: University of Minnesota Press, 1951. Pp. xii+266. $3.50.

This is the story of a woman whose life has been devoted to the betterment of working conditions for women and will be of interest to those responsible for the vocational education of women and girls.

In her own simple language, as told to Mary Winslow, Mary Anderson reveals her life story. In recounting her experiences she describes her struggle for the unionization of women's industries. She tells, too, of her 25 years of federal service during which standards for women's employment were established. This is

ar absorbing story, and one that documents an important aspect of our country's development.

Mary Anderson and Mary N. Winslow were prominent members of the staff of the Women's Bureau in the U.S. Department of Labor.

Electrical Communications Experiments. Reed, Wagner, and Corcoran. New York: John Wiley & Son, Inc., 1952. Pp. viii+458. $6.75.

While intended primarily as a laboratory manual to be used in the college course in electrical engineering, this book can be used by the electrical- or radio-shop instructor to demonstrate the basic theory that lies behind the making of many electrical measurements. Lecture notes and instructions for 60 experiments on d-c and a-c fundamentals, engineering electronics, and radio engineering are included. Almost all of the experiments can be performed without the use of special equipment; using only standard measuring equipment and conventional components.

Henry R. Reed, T. C. Gordon Wagner, and George F. Corcoran are members of the Department of Electrical Engineering at the University of Maryland, College Park.

Pamphlets:

A statement of the Place & Purpose of Industrial Arts in Education is a leaflet issued by the Industrial Arts Policy and Planning Committee of the AVA. It defines and gives the purpose of the field, lists basic areas, outlines grade levels, and gives types of organization. The leaflet will be useful with lay groups and school administrators as well as teachers. Available from the AVA, 1010 Vermont Ave. NW, Washington 5, D.C.

Looking Ahead by Way of Apprenticeship is a small illustrated brochure available from the Bureau of Apprenticeship, U.S. Department of Labor, Washington 25, D.C. It is subtitled "A Message to American Youth" and gives information on various apprenticeship programs for students. It includes a list of apprenticeable trades with the years required as well as lists of regional and state offices of apprenticeship agencies.

Teaching Aids is a listing of the various helps available from the School Service Department of the Westinghouse Electric Corp., 401 Liberty Ave., P. O. Box 2278, Pittsburgh 30, Pa. A section is devoted to aids in industrial-arts teaching. Please mention SCHOOL SHOP when requesting this pamphlet.

Audio-Visuals:

A Guide to Audio-Visual Materials in Industrial and Labor Relations is an annotated listing of films, filmstrips, and recordings made during the last ten years. Compiled by Professor J. J. Jehring, the booklet is available from the School of Industrial and Labor Relations, Cornell University, Ithaca, N.Y., for 25c except to residents of New York state to whom no charge is made.

Block Cutting and Printing is a 13-minute, sound, motion-picture film which shows how to cut and print a two-color design. It covers details of transferring the design, cutting, proofing, correcting, registering for color, and printing the blocks by three different methods. Suitable for junior-high through college and adult levels. Sale price is $115. Preview prints may be secured from David P. Barnard, Director of Audio-Visual Education, The Stout Institute, Menomonie, Wis.

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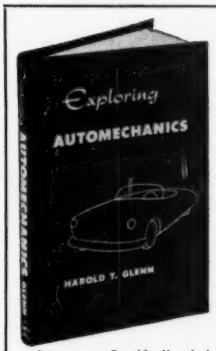

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News from INDUSTRY

New Speedmatic Tools by Porter-Cable

The Porter-Cable Machine Company has announced a new group of Speedmatic portable electric tools featuring one interchangeable motor. The group includes two routers, a plane, and a lock mortiser.

The routers are used with an assortment of bits and cutters to make a variety of cuts for grooving, veining, shaping, molding, coving, rabbeting, dadoing, and other shapes. The outstanding advantage of the Speedmatic router is the interchangeable power unit which can be transferred to the plane, cutter sharpener, or lock mortiser.

The cam-lock chuck originated by Porter-Cable eliminates chatter and kick by assuring bit concentricity and removing the hazards of vibration, burning, inaccuracy, and slippage. This new chuck also simplifies the insertion of bits and cutters, requiring only a quarter-turn.

A patented depth dial, an easy-to-read calibrated ring, enables the operator to dial directly the required cutting depth without the usual complex adjustments.

For descriptive literature write Porter-Cable Machine Co., Syracuse 8, N. Y., mentioning SCHOOL SHOP; or *check no. 25 on the coupon.*

Williams Introduces Reversible "Superratchet"

A new reversible ratchet, No. S-52 has been added to the ½" Square Drive "Supersocket" line manufactured by the J. H. Williams & Co.

This "Superratchet" has a concentric type mechanism of 82 tooth action which provides unusually small increments of ratchet action, facilitating the rotation of nuts in close quarters.

The unique design and accessibility of the "shifter" is said to provide instantaneous reverse action and one-hand operation. A knurled handle affords the operator a firm grip. The No. S-52 is made of selected alloy steel, heat-treated, highly polished, and chrome plated.

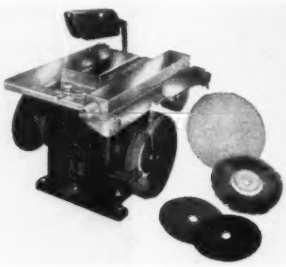
For details from the manufacturer write J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y., mentioning SCHOOL SHOP; or *check no. 26 on the coupon.*

Lufkin Universal Dial Test Indicator

Designed so that it is lightweight but substantial, the new Lufkin dial test indicator is also durable and adaptable. A simplified mechanism results in a smoother and more sensitive action and insures longer life. All greasing and oiling are eliminated. Available in two models. For folder giving description and prices, write to the Lufkin Rule Co., Saginaw, Mich., mentioning SCHOOL SHOP; or *check no. 27 on the coupon.*

Stanley Electric Introduces "SHOP" Power Tool

A new combination power tool that saws, grinds, sands, polishes, and wire brushes is being presented by Stanley Electric Tools and



features a ⅓ hp built-in motor that can be used as power for other shop equipment.

Safety devices include a key switch and guards for saw and grinding wheels.

The "Shop" does not require any belt conversion and has a useful accessory selection—a drill set, flexible power shaft, jointer-shaper, cutter assortment, sanding table, buffing wheel, and stand.

Request more information from Stanley Electric Tools of New Britain, Conn., mentioning SCHOOL SHOP; *or check no. 28 on the coupon.*

"Deltashop" Combines Four Basic Tools

Delta Power Tool Division of Rockwell Manufacturing Company has announced the production of a new combination tool known as Deltashop, consisting of the four basic tools most often used in a woodworking shop. The entire assembly is built around a tilting-arbor circular saw. The four tools are mounted on a single stand and receive power from a single motor.

Other separate components include a drill press, a jointer, and a sander, all designed so that they may be "broken down" into individual tools which can be mounted and powered separately if desired.

The Deltashop in normal position is set up to function as a circular saw or a jointer. Changeover time for operation as a drill press is one minute; as a sander, 30 seconds.

More information may be obtained by writing Delta Power Tool Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa., mentioning SCHOOL SHOP; or *check no. 29 on the coupon.*

New Literature:

General Catalog No. 5205, a new 88-page catalog, has just been released by the South Bend Lathe Works. It has illustrations, descriptions, and specifications of all South Bend lathes, shapers, and drill presses. Several new models are featured in this catalog for the first time, including a pedestal-type tool grinder and many tools and attachments for the South Bend line. Copies may be had by writing South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind., mentioning SCHOOL SHOP; or *check no. 30 on the coupon.*

You Can Be There, a free booklet, is being distributed by the Allied Radio Corporation, in cooperation with the American Radio Relay League, the national association of radio amateur operators. It is a story of amateur radio and the thrills found in operating a "ham" station.

To obtain copies of the booklet write to Zole Csolkovits, W9TXZ, Allied Radio Corporation, 833 W. Jackson Blvd., Chicago 7, Ill., mentioning SCHOOL SHOP; or *check no. 31 on the coupon.*

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12-52

For Tomorrow .... *from page 10*

well or better, but this one is rightfully the problem of the school.

5. Establish learning habits.—Do the students realize that this is a swiftly changing world, that little we learn is for keeps? Do they realize that throughout their vocational life they will be learning and relearning? Do they realize that natural intellectual curiosity, and other techniques of learning that come easily in youth begin to slow down at about 30 years of age unless practiced and exercised as conscientiously as a violinist does to hold his skill, or an acrobat to hold his? Does he know that habits and some simple mental gymnastics can secure learning skill indefinitely beyond the 30-year critical period?

If not, you must help destroy this camel theory of learning too often accepted by students. Our intellectual humps no longer carry us very far without another drink at the springs of learning.

6. Expose trainee to selected job experiences for training in the mental and physical skills of the job.—Vital as it is to the ultimate skill of the workman, if you cannot provide this, as is usually the case, don't worry. This is properly the responsibility of the trade. Its success depends on real full-sized up-to-date equipment operated at production speeds, using standard materials, latest methods, and meeting standard quality requirements. Here industry has the advantage and should, I believe, carry the ball.

Training a boy is not a one-man or one-institution job. It is a team task. These responsibilities should be divided but done cooperatively. Why not make that division a logical and proper one? This can only be done when you in schools, and we in industry understand and appreciate the whole problem, and understand each other. ★

(NOTE: The foregoing article was adapted from a talk given before the International Graphic Arts Education Association.)

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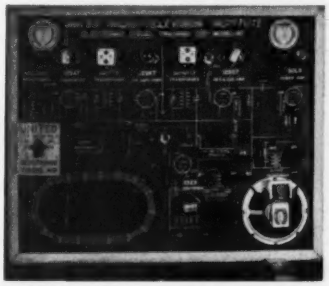

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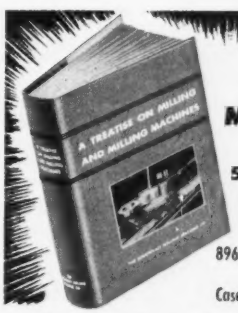

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Washington . . . . *from page 40* pupil appraisal held by the Life Adjustment Education Commission last month.

The Commision turned its attention to appraisal because it is convinced that teachers teach what they test. In other words, the test still determines subject matter content—including shop. If we are to get away from this, the teacher himself must decide what changes and what improvements should take place within the pupil, and then use that information to help the pupil move forward.

The individual teacher "with an evaluative viewpoint" will do more to move high school education from its traditional courses than national or state commissions. But each teacher's evaluation must not get lost. It must be built into a steadily expanding dossier which records the pupil's progress through the years. Call it cumulative record, or profile index, the object is the same; to develop a record of the pupil that has meaning for every teacher as long as the pupil stays in school.

Said Arthur Traxler of the Educational Records Bureau, "Many millions of tests are administered in our schools each year. Are the results of one-tenth of these tests actually used? Where they are used, it's only for immediate and transitory purposes such as giving marks at the end of the term. In comparatively few schools do test results become a part of the cumulative record that grows and acquires meaning with the growth of the pupil."

Not What We Teach, But How We Teach It.—In one of the sideshows of the Life Adjustment Conference, Ralph Tyler, of Chicago, gave vocational teachers a lesson in how to teach.

He complained that vocational courses are still taught as technical skills, with little attention to the broad personal and social meanings that can be developed "from vocational centers." Dr. Tyler said that it is not what we teach, but how we teach it that is really important. He said that any vocational subject can be taught so that the pupil will see its meanings, its values for himself and society, the science behind the technological operation. If a vocational course is taught in this manner the student broadens and deepens his understanding.

The next great step in secondary education, Dr. Tyler said, is for each school faculty to decide what students should derive from each subject—with emphasis on the big, broad personal and social values, then teach that subject so as to achieve these goals.

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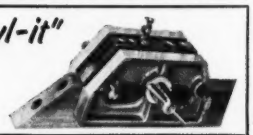

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Politics in the School.—When local school officials are elected instead of appointed, there's likely to be trouble. This is the lesson from a controversy which flared in Dade County (Miami), Florida.

The Defense Commission (NEA) has dug into a complicated case involving the firing of 16 shop teachers. It found a disturbing story of poor personnel practices, autocracy, fear, suspicion.

These evils, the Commission says, stem from the fact that the school system was too much wrapped up in politics. With the county and state superintendents elected, they become so involved in politicking that "the school system, the children, and the community are certain to be adversely affected."

Superintendents should be appointed, the Defense Commission says, and such appointments should be strictly on demonstrated ability. The Commission's report is entitled, "Miami, Florida. An Example of the Effects of the Injections of Partisan Politics into School Administration."

Today's School Problems.—In his speech following his inauguration as NEA executive secretary, William G. Carr concentrated on what he called today's major school problems, such as: How can freedom of teachers be safeguarded? What part should the teacher play in today's conflict of ideas and ideals? How can we secure enough qualified teachers? ★

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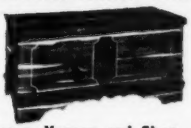

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The Defense Mobilizer is also happy about our manpower resources. There just isn't any shortage of skilled workers. Each year our labor force grows in numbers. Each year the productivity of workers increases. Here are examples of progress in production: Two years ago we hardly had one plant to produce the B-47, a medium bomber. Today B-47's are being turned out at the rate of better than one a working day. Two years ago we could turn out only three fighter bombers a day. Today we can produce more than 13 a day.

The Big Eight.—"It's wide open. The committee can do anything it wishes." These words describe the freedom which Commissioner of Education Earl J. McGrath gave to the newly-appointed Committee of Eight on vocational education.

The appointment of this group may be one of the big events in the history of vocational education. Hopes of both vocational and general educators are centered on it.

The former look to the Big Eight as a task force to sweep away the criticisms of the Hardy Committee report, create a more friendly feeling in Congress toward vocational education, and in that way (possibly) bring more federal money as one result.

General educators, on the other hand, look to the Big Eight as a flying squadron which will help break down the walls which, while becoming thinner, are still separating vocational education and general education.

"It would be a shame if such a distinguished group were to content itself merely with answering the criticisms of the Hardy Committee report," Commissioner McGrath said.

It is McGrath's hope that the Committee of Eight will "give us a judgment on the entire vocational education program."

"This, of course, means," McGrath added, "that the group will have to analyze the Smith-Hughes and the George-Barden acts to see how well they're doing at this time."

This is precisely what the chief State School Officers have been waiting for. This body, representing the 48 states, has long held that the basic vocational acts may have been satisfactory in 1917 and in 1935 but are fast outliving their usefulness.

Will the Big Eight write and propose new legislation? "The group can do anything it wishes," Mr. McGrath replied.

Thus, vocational education stands at an important point in its history. And fortunately those who are to lead it towards its next milepost are able and distinguished.

Representing the chief State School Officers are: Dowell J. Howard, Virginia, a former state director; Dean M. Schweickhard, Minnesota, another school executive who came from the ranks of state directors; Pearl A. Wanamaker, Washington, who is expected to lead the group towards a consideration of broad policy rather than detail; and Lewis A. Wilson, New York, who has had close contact with industrial education.

Representing vocational educators are C. M. Miller, Kansas; M. N. Stratton, Massachusetts; Mark Nichols, Utah; and J. Warren Smith, North Carolina.

The Big Eight will be helped by four consultants from the Office of Education staff: Wayne Reed and Galen Jones are expected to support the point of view of the general educators; Joseph Strobel and James H. Pearson are expected to push the point of view of vocational men.

Pupil Appraisal.—Out with mass testing.

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This is the gist of the conference on

(*Continued on page* 38)

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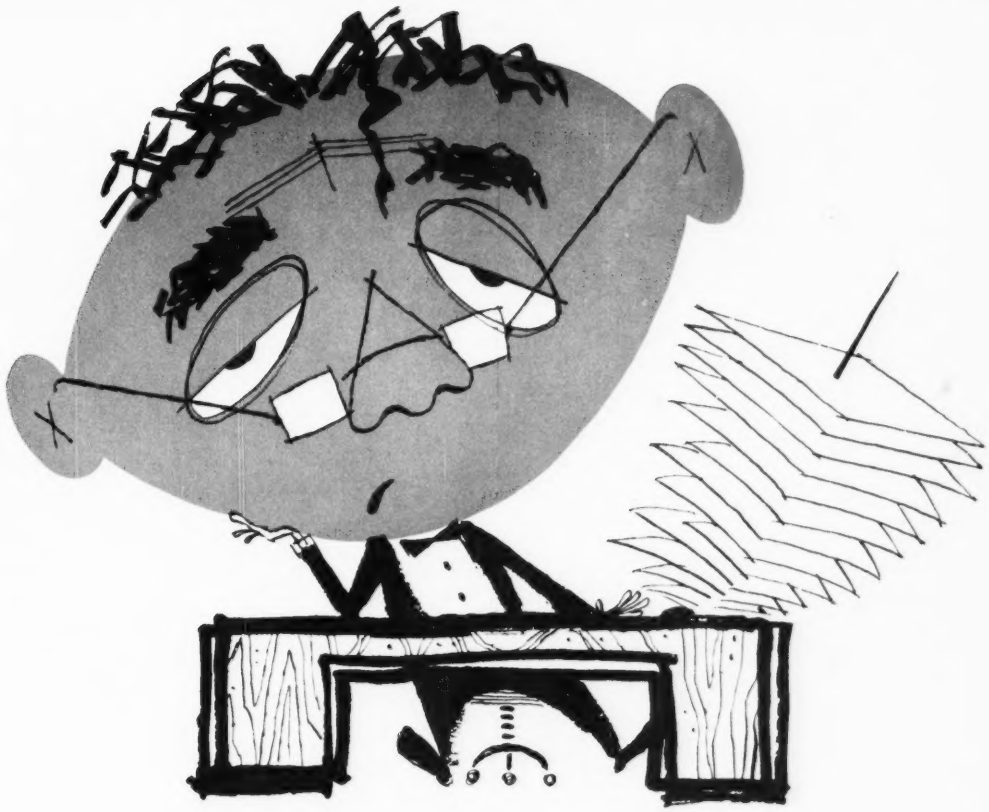

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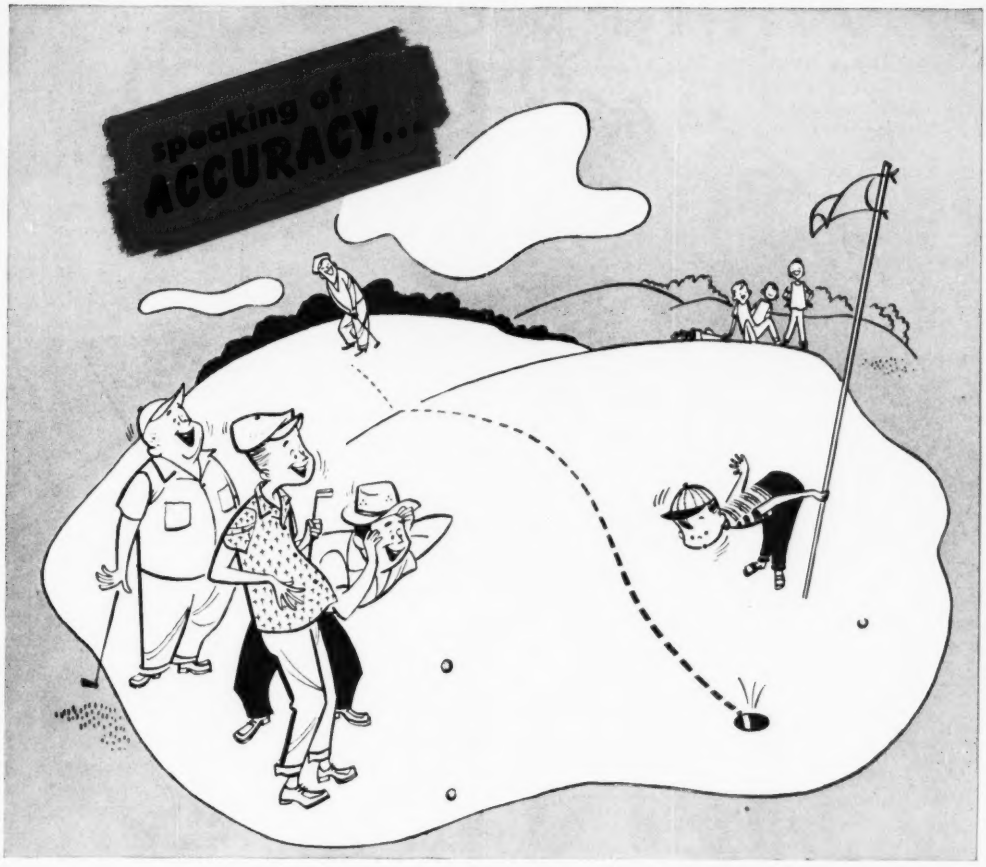

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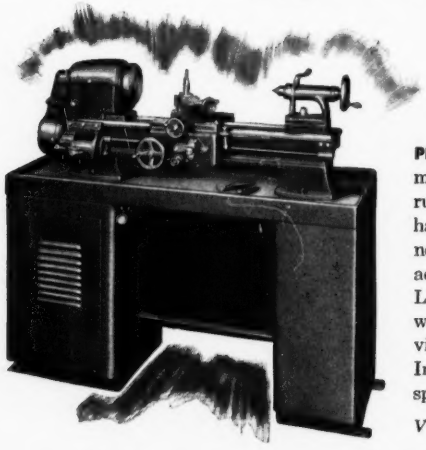

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